The Chemical Age

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Contents.

NOTICES.—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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Chemical Industry Finance

THE annual meeting of the Society of Chemical Industry in Liverpool next week promises to attain at least an average level of interest. The social side is as usual well provided for, the visits to the Crosfield and Port Sunlight works will doubtless attract large parties, while the President's address (which promises to be among the best the Society has listened to), the Messel Lecture by Lord Leverhulme, and the election of Mr. Woolcock to the chair in succession to Dr. E. F. Armstrong will be the chief features at the conferences.

The prospects for the Liverpool meeting would be perfect but for two little clouds on the horizon, which it would be unwise to treat as negligible. Both relate to finance. One is the continued decline of members' annual subscriptions. The sum of £10,786 14s. 2d. received for the past year is £705 19s. 2d. less that that for 1922. It is not, it is true, a ruinous decline. Still, a loss of £705 in the most stable of the Society's sources of revenue is a little disturbing, and the fact that there should be a decline in membership at all calls for consideration. In this connection two practical questions might well be raised at the annual meeting. Why are members falling off faster than they are coming in? Is it due to positive dissatisfaction with the Society's work, management, or policy; or is it merely due to lack of effort on the part of the Society itself to put its work and its claims before those who are at present outside its membership?

The other serious point is the heavy loss on the Society's journal, or rather on a section of the journal for which the Society appears to be financially responsible, while the control is in other hands—in itself always a doubtful policy. As regards the journal proper—that is, the *Abstracts* and the *Transactions*—the position looks sound enough. The total expenditure is £19,958 8s. 1d., against an income of £14,751 2s. 3d., a nominal loss of £5,207 5s. 10d. As the journal, however, is free to members, a proportion of the subscriptions may properly be placed against this loss, and the position would thus be about equal. Even if there were an actual deficit, this branch of the Society's work is so indispensable that the necessary funds could always be raised to cover it. The bequests and donations to the Society are, indeed, meant to enable the Society to do work which no other body could undertake, and as long as that work is really good, as the *Abstracts* and the *Transactions* admittedly are, we do not think it will be allowed to fail for want of funds.

When, however, one looks at the accounts for the new section of the journal, known as *Chemistry and Industry*, the position is very different. When the Society decided to publish its journal weekly instead of fortnightly, it was also decided to incorporate a news or newspaper section which—as we have heard it playfully suggested—was to be a replica of or a substitute for THE CHEMICAL AGE. This section, entitled *Chemistry and Industry*, is described as the "official organ of the Federal Council for Pure and Applied Chemistry," but the Society appears to be responsible for its cost. The accounts for *Chemistry and Industry*, now included in the balance-sheet for the first time, are rather startling. The expenses for the year amount to £6,865 19s. 11d., and the only revenue against this is £377 14s. 1d. received in subscriptions. There is thus a loss on the twelve months' publication of £6,488 5s. 10d., which falls on the Society. To meet it the Society has had to draw on its own Accumulated Fund to the amount of £5,401 17s. 5d. (£5,142 2s. 11d. War Loan sold and £259 14s. 6d. interest on this sum up to the date of sale), and there is still a debit balance shown in the accounts of £1,086 8s. 5d., which is met out of the Society's general revenue. Put in another way, the Society's Accumulated Fund has been reduced from £18,050 5s. 10d. to £12,908 2s. 11d., and, in addition, it has had to supply £1,346 2s. 11d. out of its current income. Compared with the £6,488 which the Federal Council's new organ has cost the Society, the Society's grant of £1,505 to all its sections at home and abroad looks comparatively trivial, while subscriptions and donations to various public objects only amount to £235. The balance-sheet as a whole shows a nominal credit balance of £387 17s. 1d., but as this has only been attained by a heavy sacrifice of the Society's invested funds, it is really a fictitious

figure. This is the most serious balance-sheet the Society has been faced with for some time, and the members may reasonably look to those responsible for some statement of future policy.

The Alkali Report

THOSE engaged in the chemical industries who make a practice of studying the yearly report issued by the Chief Inspector under the Alkali Acts must have long since appreciated that it contains a great deal of information which, owing to its exclusiveness, is of a particularly valuable nature. In the report which has just been issued, Dr. Lewis Bailey, as in his previous reports, has not merely reiterated the results of official inspections carried out by himself and his staff, but included some explicit little summaries of the conditions in different branches of the industry. Apart from the inside views which we are accordingly given, there is a spirit of helpfulness expressed throughout; and, after reading the present report, we believe that even those who are associated with non-scheduled processes, and who may find themselves the target of squeamish neighbours, would receive the most sympathetic and helpful treatment if they put their trouble before the Chief Inspector. In reading between the lines of the report, one cannot help but feel that those who are resident in the neighbourhood of works are becoming far more jealous of their rights to live in an atmosphere of purity. No one will deny that the town-dweller must be protected; but there are instances where he is tending to become over-particular, where attitudes are adopted which, if upheld in official directions, might endanger the continuance of certain industries, and which can only be described as frivolous. It is in such instances that the Chief Inspector's department can prove of real value. The law, at least as regards certain processes, is nothing if not definite; and if the Alkali Works Department is satisfied that the law is being complied with then this should be sufficient to end the matter.

From the figures which are given in the report it is found that the number of works in operation in England and Wales continued to undergo reduction (from 1,240 in 1922 to 1,219 last year), while the number of separate processes was also fewer. We are not given any indication, as we used to be in some of the older reports, of the particular processes which are responsible for the reduction; but it is encouraging to hear that, although it is not yet possible to chronicle any definite revival, there was fair activity in some directions. One would, perhaps, have liked to know something more of the position in the sulphuric acid industry. We are told, for instance, that the chemical manure (superphosphate) trade was in a very unfortunate position, many manufacturers having to stop production entirely. This, in turn, must have reacted on the sulphuric acid situation; and possibly, combined with other factors, it has had some definite influence on the extent to which acid manufacturers are curtailing production. We note that the report bears out our statement last week that sulphur is tending to replace pyrites as raw material, and we are led to expect a continuance of this practice. A great deal of space is given in the report to the investigatory work which has been carried out by the Department in connection with the disposal of spent liquors from ammonia liquor stills. The problem is, owing to the complex nature of these liquors, far more troublesome than it appeared to be when originally tackled; but the thorough knowledge which is gradually being accumulated by the most minute analysis of the liquors seems likely to lead to the perfection of a method which should leave nothing to be desired.

Chemistry and Power Development

THE first World Power Conference, which has been organised by the Council of British Electrical and Allied Manufacturers' Association in co-operation with various technical and scientific institutions and industrial organisations in Great Britain and other countries, held its opening sessions at Wembley at the beginning of the present week. The object of the Conference is to consider in all their aspects the problems associated with power development in all parts of the world, with a view to the avoidance of waste and the general improvement of efficiency. In all over 400 papers have been entered for the Conference, which will form a most valuable volume of transactions when they are collected together and published. The impression given by the opening speeches was that power-supply questions are being seriously tackled in nearly all countries, and that generally speaking at the moment schemes of development are either in progress or in view which would more than satisfy local needs. For example, in India there is an enormous potential supply of water power in the Himalaya region, which, with a well-thought-out transmission scheme, could provide power for the whole of northern India and lead to great industrial expansion. That there are very large future possibilities in hydro-electric power development and transmission is indicated by the fact that in British Columbia power is transmitted over 450 miles (at 22,000 volts) from its source to the industrial area where it is used.

The fact emerged from the earlier speeches that the world must look for its future power requirements mainly to hydro-electric developments and to the scientific utilisation of coal supplies. The President (Sir John Snell) pointed out that in this country too much coal is consumed wastefully, and Sir Richard Redmayne, in estimating the probable duration of the coal supplies in Great Britain, gave a figure of 600 years only. In Asia and the New World cheaply got coals would be available for a longer time. The avoidance of waste in the use of coal is a question upon which the chemist should be able to speak with authority, and it is satisfactory to note that papers will be presented on fuel conservation and low temperature carbonisation by authorities such as Mr. F. W. Goodenough, Dr. C. H. Lander, Mr. W. Gordon-Adam, Professor H. E. Armstrong and others. With regard to liquid fuel, it is significant that more than one speaker pointed out that the world cannot rely upon its petroleum deposits for many generations, and that such fuels must be looked for in the future from low temperature carbonisation, alcohol production, or some other source. An interesting suggestion was made that it might be necessary at some future time to obtain a liquid fuel from hydro-electric sources,

presumably by rendering electrolytic hydrogen in some way transportable.

Another section of the conference in which the chemist will be interested, as a consumer rather than as a producer of power, is the electro-chemical division, in which the papers will be presented on Wednesday, July 9. This side of chemical industry has been more largely developed abroad where cheap electricity is at hand, and the papers by foreign authorities should be of great interest, especially in view of the possibility of hydro-electric power being available here if present schemes materialise.

Some Points on Heat Insulation

THOSE chemical engineers who are associated with plant and processes in which the question of heat retention and insulation assumes importance would do well to obtain a copy of the report of the Refractory Materials Joint Research Committee, which was presented at the annual meeting of the Institution of Gas Engineers held in London last week. The subject of heat insulation has frequently been alluded to in these columns, and we have from time to time called attention to the contradictory views which both the research worker and the practical user seem to hold as regards the efficacy of the materials available. One of the arguments raised against the use of diatomaceous earths was that at higher temperatures they lose a good deal of their insulating properties, and it was no less an authority than Dr. J. W. Mellor who suggested that at high temperatures heat may be transmitted by way of the pores of the material at a rate which is comparable with that of conduction through the solid matter.

In the report referred to, Mr. A. T. Green deals in an extremely lucid manner with the thermal conductivity and other properties of insulating substances made from diatomaceous earths. Perhaps the most notable result which emerges from his experiments is that the thermal conductivity of an ordinary Stourbridge firebrick is (at 500° C.) about four times as great as that of a brick made from diatomaceous material A statement of this kind at least seems to show us where we are, and should tend to dispel the fears of those who question the value of such materials at high temperatures. There are one or two other facts brought out by Mr. Green which we shall do well to bear in mind. Thus, he tells us that the refractoriness of the two samples of diatomaceous earths which he tested was very low, and in some cases a shrinkage due to incipient fusion was found to occur. The point to note is that the fusion is the outcome of the presence of fusible impurities in the original sand. Mr. Green suggests, therefore, that where the material is required for very high temperature insulation some purification of the original earth should be effected, so that a brick containing at least 92 per cent. of silica results. This fact assumes still more importance when it is remembered that in modern kiln construction the use of insulating materials is resulting in the design of thinner kiln walls. It should be emphasised, therefore, that wherever the walls are so designed, diatomaceous bricks of good quality should be used, since the face temperature of the insulation wall will, under such circumstances, be much higher.

Cheaper Patent Procedure

MR. BLACK'S plea in the House of Commons for a cheaper Patent procedure produced no response from the President of the Board of Trade, who frankly stated that he could hold out no hopes of such a reform. Emphasising the importance of encouraging inventive genius, he pointed out the very large profit which the Patents Department shows—he put the figure at £240,000—and pleaded for a reduction of the present fees to encourage workmen and others to develop inventions. Another suggestion he made was that a consultative committee or board should be established at the Patent Office so that men in industry could obtain advice without having to pay too much for it. At present, he said, they had to consult Patent agents, who—as he alleged—" to a large extent are tied up and employed by the larger engineering firms." Mr. Webb contented himself with a general assurance that the British Patent Office is " one of the cheapest in the world." That may be, but it is still a profit-making department, and the answer does not meet the point that the cheapening of fees by lessening the profit might be of great advantage to the poor inventor.

Points from Our News Pages

The chief features of the annual report of the Chief Inspector of Alkali Works are reproduced (p. 4).

What is described as the new " American " process for the fixation of atmospheric nitrogen is explained and illustrated by a plant diagram (p. 7).

Further notes are published on chemical exhibits at the British Empire Exhibition (p. 8).

The concluding papers at the Refrigeration Conference deal with the industrial preparation of hydrogen and various applications to technical processes (p. 9).

Sir Ernest Benn's article this week deals with " The Cost of Living "(p. 10).

Particulars are published of the new Knowles Patent Column Cell (p. 11).

Increased activity is reported in the London Chemical Market. Conditions are unchanged in the Scottish Market (p. 18).

Our Monthly Metallurgical Section contains an article on brass and gunmetal analysis, metallurgical topics of the month, a commercial and financial letter, Patent notes, a list of current articles and commercial intelligence.

Books Received

PROCEEDINGS OF THE PHYSICAL SOCIETY OF LONDON. Vol. 36, Part 4. London: Fleetway Press, Ltd. Pp. 100. 6s.

APPLIED CHEMISTRY. By Ira D. Garard. New York and London: MacMillan and Co., Ltd. Pp. 496. 15s.

The Calendar

June 30 to July 12	World Power Conference	Wembley, London.
9	Society of Chemical Industry: Annual General Meeting. Presidential Address by Dr. E. Frankland Armstrong. 11 a.m.	Arts Theatre, The University, Liverpool.
10	Society of Chemical Industry: Messel Memorial. Lecture by the Rt. Hon. Viscount Leverhulme.	
	Society of Chemical Industry: Annual Dinner	Midland Adelphi Hotel, Liverpool.
15	Institute of Chemistry Students' Association (London). Visit of Students to Wembley.	London.
16	Institution of Chemical Engineers: Annual Corporate Meeting. 11 a.m.	Hotel Cecil, Strand, London.
19	Physical Society of London: Special meeting by invitation of Sir Ernest Rutherford, and of the Directors of the Cambridge-Paul Scientific Instrument Co.	Cambridge

Annual Review of British Alkali Works in 1923

The following notes are abstracted from the report of H.M. Inspector of Alkali, etc., Works for 1923, published by the Stationery Office, price 1s. 6d. The report is virtually in three sections, dealing with (1) works in England and Wales, (2) investigations on the treatment of effluent spent liquors and (3) alkali works in Scotland. We give below the greater part of the first section of the report.

Works in England and Wales

THE total number of works registered was 1,219, which entailed the inspection of 1,995 separate units (processes). Compared with the previous year, this is a reduction of 21 in the number of works, and of 10 in the number of processes.

The number of visits of inspection to registered works during the year was 3,924, in the course of which 2,630 quantitative estimations of the noxious constituents of chimney and other gases escaping from the processes in operation were made.

A number of visits were paid also to works concerning which complaints of nuisance were received from Medical Officers of Health and others, but where no operations were carried on which are registrable under the Alkali Act. In such cases the assistance of the Alkali Inspectors was invoked with a view to ascertaining whether, and if so what, practicable means could be adopted in order to obviate further nuisance arising from the processes that were being carried on.

In several quarters, for instance, the rapid growth of petroleum refineries has been a source of nuisance, owing to the fact that the waste gases escaping from the distillation of crude petroleum were permitted to pass directly into the atmosphere. It has been possible to get these gases, which have a considerable calorific value, trapped and made use of, with advantage to both the surrounding neighbourhood and the manufacturer.

In one of the districts the bleaching of wool by means of sulphur dioxide was complained of, as constituting a nuisance to those living in the neighbourhood of the works. The sulphur dioxide is produced by the burning of sulphur and the methods adopted are really very crude, no attempt being made to deal with the considerable quantities of excess sulphur dioxide, which consequently escapes into the air.

Excessive smoke from coke-ovens, too, has received some attention by the Department, and amelioration of the nuisance due to this smoke has been attained by the dissemination of information regarding the possibilities of auxiliary flues, and by the practical experience of members of the Alkali Staff in such matters.

Complaints of nuisance against registered works have not been excessively numerous. Generally speaking, these were due to short-lived escapes of fumes caused by accidental occurrences, and were not of a character warranting the institution of legal proceedings.

It is not possible to chronicle yet any definite revival of chemical industries in general. In some directions there has been fair activity; in the tinplate trade there has been exceptional activity; in certain other directions it has been quite the reverse; for instance, the chemical manure (superphosphate) trade has been in a very unfortunate position, for it has been possible to import the foreign manufactured article at a price less than the cost of production in this country, a fact which has had the effect of compelling manufacturers to stop production in many cases entirely. At the same time chemical manufacturers are fully alive to the possibilities of introducing new products and of adopting new processes, where such appear to possess advantages and to make for advancement generally.

Six works were found operating without having registered before commencement.

Alkali and Copper (Wet Process) Works

Only a small proportion of the available plant has been in steady operation. The necessity for the process as a means of producing hydrochloric acid is becoming less and less as the synthetic manufacture from hydrogen and chlorine, produced by the electrolysis of brine, extends.

Mechanical saltcake furnaces of new types continue to make their appearance, but it cannot be said that these make much headway.

The still further extension of the use of sulphur instead of pyrites in the manufacture of sulphuric acid means, of course, less and less material available for the wet extraction of copper; consequently work in the latter direction is of limited character.

One saltcake plant was the source of some anxiety to the District Inspector for a period, owing to unduly delayed repair to certain portions of the plant. The desired improvement has been effected, and the plant is now working satisfactorily.

Condensation of hydrochloric acid at all works has been satisfactory, as regards both acidity of chimney gases and percentage condensation.

Cement Works

A considerable number of cement works have been operating but export trade has been much restricted, and the industry is still far from attaining normal proportions. Chamber kilns are still very much in favour, particularly in the South of England, and they continue to hold their own.

No advance has been made in the direction of recovery of potash from cement dust; there is no possibility of competing with the natural potash deposits.

Smelting Works

At two works—smelting works—considerable progress has been made in the collection of fume. Hitherto the amount of valuable metallic oxides in the chimney gases at some works has been sufficient to produce an almost neutral solution on shaking a sample of the gases with water in a bellows aspirator, although the acidity of the gases themselves was equivalent to about 3 grains of SO_3 per cubic foot. Recovery of the constituents referred to, by means of ample flues and such appliances as cyclone dust catchers, marks a desirable advance.

The calcination of zinc blende constitutes at present the chief feature so far as smelting works are concerned. An increasing amount of sulphuric acid has been made this year from the gases evolved in this operation, and at several additional works this recovery of a valuable by-product has been receiving attention. The problem is somewhat complicated by the fact that the bulk of the blende now being used consists of Australian concentrates, which contain a notable amount of lead. However, on the whole, one may be well satisfied with the progress that has been made, and with the interest displayed by the sulphuric acid manufacturers. During the coming year increased activity in the spelter trade of this country is anticipated, and preparations are in progress for extended treatment of blende, with recovery of sulphuric acid during calcination.

The average total acidity of all smelting works chimneys during the past year was equivalent to 3·33 grains of SO_3 per cubic foot; that of blende calciner chimneys (at works where there is no recovery of sulphuric acid) was 8·58; so that with general recovery of acid from blende calcination a vast improvement in atmospheric conditions should accrue in the districts where this operation is carried on.

Sulphuric Acid Works

There has been a further increased replacement of pyrites of sulphur as raw material for the production of sulphuric acid. So long as first cost, coupled with the manufacturing advantages, remains favourable, we may look for a continuance of this practice: the essential advantages are the possibility of increased output of acid in any given unit of plant, the direct production of a practically non-arsenical acid, the reduced cost of handling, and the absence of troublesome residues.

New types of sulphur burner are making their appearance, and the use of mechanical burners for sulphur is extending.

The design of acid-making plant continues to give inventors opportunity for exercising their ingenuity, and we are arriving at a stage where the efficient working of a given type of plant is by no means the chief consideration, though more scientific methods of control of existing types do claim attention, such as, for instance, automatic regulation, actuated by variations in the temperature difference of the gases entering the first chamber and those leaving the last chamber.

Newer types of plant are being designed with a view to reducing the capital cost of installations, and, furthermore, types of plant are coming to the fore in which variations in the sulphur dioxide content of the initial gases do not have the baneful effect that they do in the existing forms of chamber plant.

The water-jacketed collar for Glover towers, referred to in the previous Annual Report, 1922, p. 6, continues to give the satisfaction that was anticipated, and its use has been extended.

During the year one more works has adopted electrostatic deposition of dust in connection with a chamber plant. The installation has accomplished what was hoped for, and now a perfectly clear Glover acid is obtained—an impossibility hitherto in this instance.

One works in a populous neighbourhood has given the District Inspector some trouble. Although exit acidities were not actually above the statutory limit, it was felt that better work might be done, with advantage to the neighbourhood. Suggestions that were made received willing attention, and improvement has resulted. At another works the Glover towers had become structurally unsound, owing to subsidence of the foundations: strong representations were made to the company by the District Inspector, and it is anticipated that reconstruction will very shortly be taken in hand. Speaking generally, however, plant maintenance has been very satisfactory. There have been minor infractions only; control of operations has, on the whole, been good.

Sulphuric Acid (Class II) Works

Concentration.—There has not been a great demand for concentrated acid. At one works, operating the cascade process, although the acidity of the chimney gases was below the Act limit, objection had to be taken to excessive low-level escape of fume. A proper draught balance must be maintained on these plants: none are working now under conditions of stress, and there is no valid reason why local fume should exist in the neighbourhood of the concentrators. At another works, where the Perrin system is in use, the acidity of the chimney gases was on occasion abnormally high. These gases are particularly irritating, and may constitute a source of considerable nuisance over quite an extended area. At the District Inspector's suggestion a water-fed tower scrubber was added to the condensing system, with good result.

The Calder-Fox scrubber continues to do good work. It would appear that under certain conditions the introduction of supplementary steam promotes condensation of the acid fume.

Contact Processes.—Attention has been drawn in past Annual Reports to the excessive acidity of exit gases from Grillo plants. The inspectors have pressed for the installation of scrubbers, fed with soda ash solution, at the end of the system, and at two works such scrubbers have been operated during the past year with gratifying results (whether viewed from the standpoint of the Alkali Inspector or that of the manufacturer). The total acidity of the escaping gases is now equivalent to less than 1 grain of SO_3 per cubic foot, and a high-strength bisulphite is made.

The introduction of the electrostatic method of dust deposition in connection with contact plants has proved its worth.

Chemical Manure Works

At such works as have been operating results have been satisfactory. The acidity of exit gases remains at a figure desirably low, and the percentage removal of noxious constituents from the den gases has been good.

Sulphate of Ammonia and Gas-liquor Works

One may say that, on the whole, operations have been conducted without offence, but at several works in the Eastern Midlands purifiers have been allowed to get into poor order—either the purifiers were too small for the purposes for which they were intended, or, where walled purifiers were employed, the joints of the brickwork had become leaky. Larger purifiers have been installed, where the existing ones were too small, and walled purifiers have been transformed into heap purifiers, with consequent improved working in both cases. At one works in the North of England, where only one heap was provided, the heap was so badly fouled during a run of the plant that removal of the oxide was found to have taken place while the plant was still operating. This is not only contrary to the requirements of the Act, but it is highly dangerous. A very severe warning was given by the Chief Inspector to the manager of the works, who promptly made provision for better absorption by the installation of an additional heap. A similar warning was necessary in the case of one other works, where now the purification system has been entirely remodelled.

Here follows, in the report, an account of the work carried out at the Hornsey and other gasworks on the treatment of effluent spent liquors, which is too detailed for summarising in the present notes.

Chlorine Works

The number of these works remains the same as in the previous year, but there has been more activity in the manufacture of chlorine products, other than bleaching powder.

There are very definite indications that in the near future liquid chlorine will play a much extended part in the industries of the country; a wide field for its use is opening up. It is now to some extent taking the place of bleaching powder, a compound possessing a certain amount of instability: hypochlorite solutions of any desired strength can by the aid of liquid chlorine be made when and where required, and the solutions thus obtained contain less sediment than those made by treatment of bleaching powder with water. Moreover, chlorine is now being used directly in a number of operations, such as the maturing of flour.

Chlorine is a particularly noxious gas, but its use is perfectly well controllable, and any excess escaping from operations in which it is employed can be dealt with quite satisfactorily. Nevertheless, there have been cases lately where it has been necessary to draw attention to the inadequacy of methods that were proposed for dealing with such excess at individual works, and to require modifications in order to ensure proper absorption.

Muriatic Acid Works

The synthetic methods of manufacturing the pure acid have given no cause for anxiety. The means adopted are entirely satisfactory from the standpoint of the Alkali Act, and control is excellent.

Fibre separation works have not been busy, but there has been more activity than in the previous year. The long period of idleness at so many of these works has resulted in detoriation of plant; it is scarcely surprising, therefore, that in several instances demand for repair has had to be made. If not kept in good repair and not operated under careful supervision, these works can constitute a serious nuisance in the populous districts where they exist.

Tinplate Flux Works.—Operations during the year have been of a very extensive character; there has been an unusually heavy demand for tinplate. Reduced costs and increased efficiency play a not inconsiderable part in the recovery that has taken place in this industry.

The use of size in the pickling process has considerably extended, with beneficial results. The District Inspector, Mr. H. J. Bailey, has done good service, too, in connection with the annealing of sheets, which is now much more scientifically controlled than formerly. This appears to have led to the amelioration of a number of difficulties, of more or less obscure origin, that were causing somewhat serious trouble in some quarters.

Scruff furnace operations have been satisfactorily conducted except in the case of one works, where immediate improvement has been required. With this one exception chimney gases have been gratifyingly low in muriatic acid and also as regards total acidity.

Tar Works

It is still necessary to call attention to the poor state of pitch coolers at some works. In one instance the District Inspector found it necessary to raise objection to the excessive temperature at which the pitch was being run to the bays.

There is no need for the evolution of annoying amounts of noxious fumes when running pitch. With proper attention to the condition of the pitch coolers and to the running-off temperature, tar works should not be a source of nuisance in the surrounding neighbourhood.

Works in Scotland

The number of works in Scotland registered under the Act was 161, in which were operated 303 scheduled processes as follows :—6 alkali (saltcake), 1 alkali (wet copper), 2 smelting, 19 sulphuric acid, 13 sulphuric acid (Class II), 24 chemical manure, 13 gas liquor, 7 nitric acid, 109 sulphate and muriate of ammonia, 2 chlorine, 3 muriatic acid, 14 sulphide, 1 alkali waste, 11 lead deposit, 1 arsenic, 6 nitrate and chloride of iron, 1 carbon bisulphide, 4 paraffin oil, 7 bisulphite, 58 tar, and 1 zinc extraction.

The Inspector made 521 visits to these works, and 37 to others, not on the register ; there were 348 chemical tests, in two of which acidity was measured exceeding the limits prescribed by the Act.

No legal proceedings were undertaken, although infractions have been rather more numerous. Each year certain works are slow to complete the formalities of registration ; it may be held that this is merely a technical error, but unnecessary labour is caused. Other infractions, by improper operation of processes, are mentioned below.

A private suit was brought against a sulphuric acid works to recover compensation for damage alleged to have been inflicted by excessive escape of acid fumes from the works. The judgment of the first court was in favour of the defence, but was reversed on appeal ; the case is not yet finished.

Against another works complaints were made by parties residing some miles distant ; no connection could be traced between the works and the complainants' ailments.

By the courtesy of manufacturers the Inspector is able to present the usual summary of raw materials and of products :—

Pyrites and Spent oxide burned for Sulphuric Acid :

In 1923	104,613 tons.
In 1922	97,919 tons.

Phosphates and Bones dissolved for fertilisers :

In 1923	54,144 tons.
In 1922	69,301 tons.

	Salts of Ammonia. Tons.	Tar distilled. Tons.	Pitch produced. Tons.
From gas works	24,587	132,018	38,630
,, iron works ..	7,757	66,852	40,280
,, coke ovens ..	8,307	17,920	7,555
,, producer gas ..	6,260	8,178	3,079
,, shale works ..	50,683	—	—
Total	97,594	224,968	89,544
In 1922	75,841	173,171	61,353

The ammonia is expressed as pure sulphate, but 6,291 tons were obtained as concentrated liquor ammonia, and 530 tons as ammonium chloride. Of the tar 90,000 tons were partially distilled to "prepared tar" for road material, without production of pitch.

The increase is general except in the phosphatic fertilisers, of which manufacture was adversely affected by foreign imports at lower price.

Alkali Works

Production of saltcake was no greater, nor was there any change in method. No alkali was made, and the old deposits of alkali waste gave no offence.

One test was measured of chimney gases exceeding the Act limit of 0·2 grain of muriatic acid ; this disorganisation was owing to workmen's neglect to remove dust from the flue connected to the condensers, so that furnace gases for a few hours were diverted unwashed to the chimney. This improper course was at once set right on remonstrance, and measures adopted to prevent recurrence.

The general average amount of muriatic acid discharged into the air was in each cubic foot of chimney gases 0·056 grain, the highest and lowest averages for any one work being 0·133 and 0·02 respectively.

Sulphuric Acid Works

Manufacture from spent oxide has continued to increase, and now has reached one-seventh of the whole production.

One test exceeding the Act limit of 4 grains of sulphuric anhydride in each cubic foot of exit gases was measured. The cause was unavoidable and due to sudden failure of the pump which supplied washing acid to the absorbing tower. Manufacture of acid was stopped at once until repair was effected. Plant has been maintained in good order, and prompt attention has been given to my suggestions, where necessary, of renewal.

Two units have been fitted with the subsidiary process of continuous oxidation of gaseous ammonia as a source of nitre supply. Results have been satisfactory, and the process has been easy of control.

Variation from the usual method of washing the residual gases of the lead-chamber process was mentioned in the preceding report ; further experience appears to confirm the expectation of its advantage. The experiment has been made by John Miller and Co., of Aberdeen, and has been closely studied during several months. The sulphuric acid plant under trial has 24 kilns to burn lump pyrites, and produces 115 tons of 123° Tw. acid weekly. Draught is by means of two fans, one placed between the Glover tower and the first of five rectangular chambers, the other between two Gay-Lussac towers. Both these latter formerly were fed with acid of 152° Tw., the recovery of nitre being 2½ tons weekly ; 92 per cent. of the total by the first tower, and 8 per cent. by the second.

The object of the experiment has been to ascertain the result of feeding the second Gay-Lussac tower with a limited quantity of water, 360 gallons daily, instead of with 31 tons of strong acid ; the first tower has continued to receive its usual flush, and the acid leaving it contains the equivalent of 1·2 per cent. nitre. The weak solution leaving the second tower tests 8° Tw. ; it contains 6·3 per cent. of sulphuric acid and the equivalent of 1·2 per cent. nitre. This is run in to the same tank as the acid from the first tower ; the mixture tests 140° Tw. and is run down the Glover tower in the usual manner. An alternative means of disposal would be to spray this weak acid into the chambers. The consumption of nitre in the nitre-oven is 12 lbs. on each ton of 123° acid made.

The acidity of the exit gases from the process does not exceed 0·1 grain SO_3 in each cubic foot, so long as good colour is maintained in the last chamber ; but it has been observed that if the last chamber becomes pale, and SO_2 passes from it to the tower fed with water, the acidity of the exit gases increases, since the absorptive power of water towards SO_2 is small. The average recovery daily by the second Gay-Lussac tower is 3,500 lbs. of 9° Tw., equivalent to 0·94 ton of 123° acid weekly, or 0·8 per cent. of the whole production.

The advantages claimed for the changed procedure are :—

(1) Less pumping of strong acid to absorb nitre.

(2) Low acidity of exit gases to the atmosphere ; normally they are free from odour ; and resulting gain in recovery of sulphuric acid.

(3) Consumption of nitre potted is unaffected.

No extra wear on the leadwork of the plant is apparent.

It may not be realised that an exit test of 1 grain acidity marks a loss exceeding 70 tons of strong acid yearly. Messrs. Miller avoid most of this loss besides saving the cost of elevation daily of 31 tons of acid ; they have shown that for long periods they can operate the process of acid manufacture at 40 times the efficiency contemplated by the Act, and I am glad to congratulate the firm and their chemists on their success. Where only one Gay-Lussac tower is attached to a unit the addition of a small condenser for washing the exit gases with water would be enough.

The general average acidity in each cubic foot of residual gases discharged was 0·76 grain of sulphuric anhydride, an increase of 0·15 grain over the acidity of 1922 ; the highest and lowest averages for any one work were 1·79 and 0·20 respectively.

There is no change to report regarding the processes of Sulphuric Acid (Class II). The general average acidity of the final gases was 0·37 grain of sulphuric anhydride.

Chemical Manure Works

Fertilisers made in 1922 were in part still unsold at the beginning of last season ; from this and other causes activity was much restricted, especially in the smaller works ; sulphuric acid manufacture also suffered since less was required.

Treatment of the corrosive gases evolved continued to be satisfactory ; the general average of the total acid in each cubic foot of gases escaping finally was again 0·09 grain, expressed as the SO_3 equivalent of silico-fluoric acid ; and percentage condensation varied between 95 and 100.

The "American" Synthetic Ammonia Process

In "Chemical and Metallurgical Engineering" for June 16 there appears an account of a new fixed nitrogen process developed at Washington, which is reproduced below.

RECENT visitors at the Fixed Nitrogen Research Laboratory, Washington, have been much impressed by the new developments of that laboratory typified in the small direct synthetic ammonia plant now being operated with a capacity of about ½ ton per 24-hour day. This plant, shown diagrammatically herewith, is based upon the results of five years' research of the Government specialists. It has already demonstrated that certain of the new principles which they propose can be operated successfully, at least upon a semi-commercial scale. Larger scale operation promises equal success.

Purification of the Gases

A large item of cost in a direct synthetic ammonia plant is the production and purification of hydrogen. Very high-purity gas is needed if highly reactive catalysts are to be employed efficiently, since otherwise the catalyst is poisoned. Because the cost of relatively complete gas purification has seemed high, many have argued that highly reactive catalysts could not be employed advantageously in commercial practice. However, Messrs. A. T. Larson and F. A. Ernst, under whose direction these improvements have been developed, have met this objection in a very ingenious fashion. In this process two catalyst chambers are employed, the first containing a rugged but relatively inefficient catalyst followed by an ammonia condenser, intended to purify the gas, and the second containing a catalyst of high reactivity, which operates successfully at high efficiency for long periods upon properly purified nitrogen-hydrogen mixtures.

Low Cost of Purification

The use of this system of purification not only is successful in eliminating the impurities of the gas but it also does this at practically no cost, since the ammonia formed in this bomb has sufficient value to pay for the cost of operating the purifying system. This making the purifier pay its own way is certainly a tremendous advance.

Once the gas is obtained in pure form, it is important to keep it so, lest on recirculation it damage the catalyst. To accomplish this result the second important advance in the process has been made at the laboratory. This is the use of a circulating pump lubricated with liquid ammonia. Elimination of lubricating oil at this point effectively prevents contamination of the purified gas after leaving the main converter. Hence after condensing the liquid ammonia completely, the remaining hydrogen-nitrogen mixture can safely be recirculated to the converter as many times as necessary. Thus there has been worked out in actual practice the important principle of "get the gas clean and then keep it so."

Essentially Similar to Other Methods

As shown in the diagram, the process is essentially similar to other direct synthetic methods in that it employs recirculation. The diagram shows the system using electrolytic hydrogen. The hydrogen supply is forced by a blower through a burner, where it reacts with an amount of air so limited as to produce only nitrogen, hydrogen, and water in the products of combustion. The excess of hydrogen is so proportioned that the mixture is exactly one of nitrogen to three of hydrogen. From the mixed gas storage a compressor drives the gas through oil traps, one of which is empty and one of which is filled with charcoal to remove all oil vapour, and then through the purifier or first catalyst chamber.

Some of the ammonia formed in this first bomb is condensed and separated from the remaining gas. The water and other products of reaction are carried out of the system as impurities in this liquid ammonia. The remaining gas, thus purified, passes to the main converter, then into the condensers, where some liquid ammonia is formed, through the circulating pump, which is sealed with liquid ammonia, and then through the final condensers. The liquid ammonia is removed in the high-pressure ammonia receivers and the remaining gas, which is still pure, returns to the inlet of the converter.

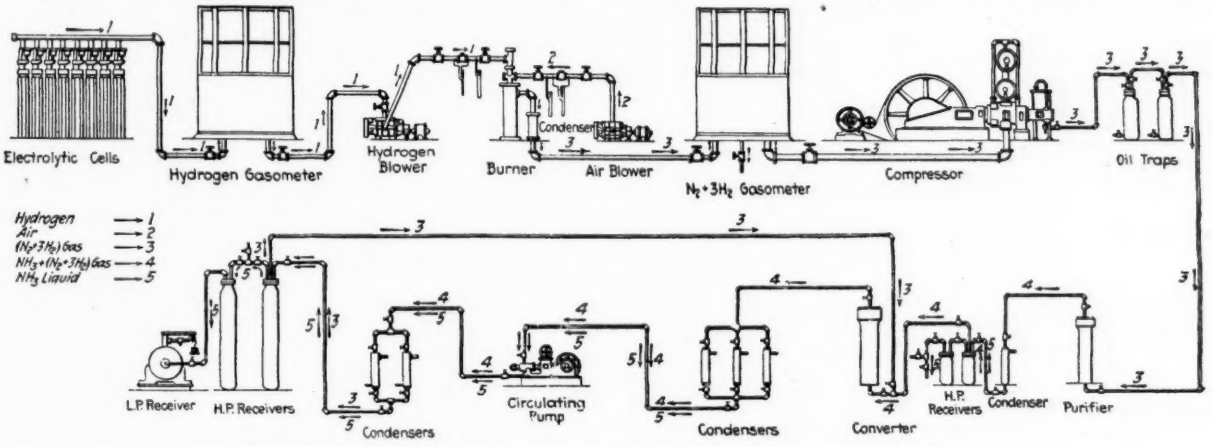


Diagram of the American Direct Synthetic Ammonia Experimental Plant

The laboratory has for some time been working on detailed engineering plans for application of this system on the scale of several tons of ammonia per day. Already several arrangements for such application have been tentatively made, and further application on a still larger scale will undoubtedly follow in the not distant future.

Sofnol Soda-Lime G

THOUGH soda-lime is one of the commonest laboratory reagents, the paucity of relevant literature would indicate that investigators in the past have overlooked its possibilities. News from the Greenwich laboratories of Messrs. Sofnol, Ltd., who have specialised on soda-lime for many years, indicates interesting results from the introduction of small quantities of activating agents into the product, in the course of manufacture. Working on these lines a grade of soda-lime has been developed which contains a fractional percentage of manganic acid. This product, which is being put on the market as Sofnol Soda-lime G, is said to have many times the absorptive capacity of ordinary soda-lime for CO_2. An additional and striking property is that of changing colour during use. This change, due to the alteration of green manganate to red permanganate under the action of CO_2, gives visual indication of the degree of saturation of the granules. Besides its advantages for industrial CO_2 absorption, Sofnol Soda-lime G has proved specially suitable for gravimetric work, such as carbon combustions. In order to meet the demand which has arisen in this direction, the makers have now arranged to supply small quantities at the rate of 1s. per lb.

The British Empire Exhibition

Notes and News of Chemical and General Interest

THIS past week has been a memorable one at Wembley in several ways. First, it is announced that the exhibition will be opened next year for a period of six months at least. It is to be hoped that all the numerous manufacturers will continue to give their support, since it is clear that the time originally allowed will prove far too short for all the visitors who wish to see the exhibition to make anything like the close inspection it deserves. Secondly, there have been two large parties of excursionists from the works of chemical and allied manufacturers who have recognised the educational value of the exhibition. The first of these was on Saturday, June 28, when 5,500 employees from Boots Pure Drug Co. at Nottingham made a one-day visit, and the second on Monday, when some 3,000 employees of Lever Brothers were present, this being the first instalment of 14,000 who are to attend on succeeding Mondays.

There is one feature which strikes the visitor forcibly on arrival at Wembley. The air temperature always seems distinctly higher there than in other parts of London, and this has been noted so consistently that one is forced to the conclusion that the exhibition has a specially warm and sheltered situation. To be forewarned is to be forearmed. Partly, of course, the warmth is due to the glass roofs in the main buildings acting as sun-traps, but this would not appear to be the whole cause. Incidentally much of this glass has so far remained quite clear and unprotected, but it is interesting to note that a coating of blue has now been extensively applied to reduce the glare. This is the case in the Chemical Section, which with its large expanses of bright paint was particularly liable to be unduly warm. The effect of the blue glass is distinctly an improvement.

A Model Dyestuffs Factory

A feature in the Chemical Section which has been attracting a good deal of attention is the model factory shown by the British Dyestuffs Corporation. This unique exhibit has now been moved into a more prominent position on the stand. A particularly good feature is the ease with which the operations necessary for the production of a typical dyestuff may be followed by anyone who will spare a few moments to study the model and the flow sheets. This model has proved a valuable feature for students, and has also been appreciated by the more educated members of the general public.

A notable change has been made in one of the larger exhibits in the Chemical Section, the display by Lever Brothers having been completely altered. Formerly this took the form of a conventional stall at which were shown the firm's various products, Sunlight Soap, Twink Dyes, Lifebuoy Soap, Lux and other well-known preparations. Now these products have been relegated to one small display case which is kept in rotation, the centre-piece of the exhibit being a model of the garden village and works of the company at Port Sunlight, Cheshire. There are behind this a number of pictures "in relief" of various factories and plantations controlled by the company and its associates in different parts of the world, while the large area of this organisation is further exemplified in an illuminated map of the world, carried out in a mediæval style, showing the location of the various plantations from which the oils necessary to the company's soap manufacture are derived, and the position of the firm's numerous factories. Altogether the exhibit is a notable one, and more in keeping with the educational appeal which is the most valuable feature of the exhibition.

The Gas Exhibit

Attention must be drawn again to the gas industries exhibit, which in many ways is very remarkable. It is situated in the Palace of Industry, close to the centre, and has been arranged by the co-operation of the various gas undertakings in the country. With the exception of the British Sulphate of Ammonia Federation and the National Benzole Association no names of commercial bodies are given any prominence in the exhibit, which is perhaps the most notable feature. Of course, it may be said that there is little need for gas undertakings to advertise one against another, for consumers have no choice as to the source of their gas supplies. Thus the opportunity has been taken of staging an exhibit designed to show to the general public the advantages of using gas. Inside the exhibit there is a series of rooms to illustrate the application of gas in the home, while another section shows the value of gas for cooking and general industrial purposes, one feature here being a demonstration of aluminium casting. Another very interesting portion of the exhibit shows a number of specimens of early burners and other apparatus and some of the early cartoons which appeared when gas was first used for street lighting. Chemists will probably be most interested in the display of coal-tar by-products, including benzol, numerous dyes, drugs and so on, all very well shown. This section is intended to indicate the advantages of gasifying coal instead of burning it raw, and the lesson is amplified by a series of comparative photographs and diagrams relating to the smoke nuisance. The Sulphate of Ammonia Federation's display, which is adjacent, shows the uses of sulphate as a fertiliser, and these sections of the gas exhibit illustrate how closely dependent much of our chemical industry is on the use of gas.

Scattered Exhibits

One of the puzzling features of the exhibits is the way in which one firm's products may be found in the most unexpected way on another firm's stand, or in some part of the exhibition not commonly associated with that firm. An example of this is the working oil-seed crushing plant erected by Manlove, Alliott and Co., of Nottingham, in the Nigerian Section, in conjunction with Nigerian Products, Ltd. This is an excellent specimen of chemical engineering practice which is well worth examining closely from the specially constructed gallery behind it. This is the firm's sole exhibit, but in some cases there are supplementary exhibits by various firms which must be as valuable from the publicity point of view as the main displays. For example, in British Malaya in connection with the demonstration of the uses of tin there are a number of dyed and printed cotton fabrics in which tin salts have been used as the mordant for alizarine dyes manufactured by the British Alizarine Co. To find British-made dyes in a prominent position in the exhibit of a "remote" part of the world produces a distinctly satisfactory effect.

British Chemical Standards

The exhibit of chemical standards by Ridsdale and Co., of Middlesbrough, comes in the category of those that are a little hard to find, since it has found a place on the stand of Baird & Tatlock (London), Ltd., who act as agents, in the Chemical Section. Here are to be found samples of the 83 standard steels, cast irons, slags, etc., which have been prepared for use in iron and steel analysis. These are intended to be used as checks, and they are supplied with a full list of all the constituents of the samples which have been determined by 10 to 19 co-operating analysts in different parts of the world. Analysts can thus check their own methods and eliminate experimental error. Another feature of interest also shown by the same firm is the "Analoid" system for simplifying determinations of phosphorous and other elements in steels. In this case well-known processes are slightly remodelled, so that the necessary re-agents may be added in the form of accurately made tablets. In this way considerable time is saved in weighing, and owing to the avoidance of the small variations in this operation there is also claimed to be a considerable gain in accuracy.

Vickers' Carillon Programme

Vickers, Ltd., have arranged an interesting programme of music to be played at 9.30 on Saturday evening next, July 5, on the Carillon Bells installed in the Clock Tower of the Vickers Research Building in the Palace of Engineering (Avenue 8, Bay 14). The recital will be given by M. le Chevalier Jef Denyn, Carillonneur at St. Rombold's Cathedral, Malines, Belgium, and the various items will be broadcast by the British Broadcasting Company from their London Station.

The Preparation and Use of Industrial Gases

Developments in Refrigeration

In addition to the papers on liquid oxygen referred to last week, a number of other papers at the recent International Refrigeration Congress were of chemical interest, and the abstracts given below cover the industrial preparation of hydrogen and various applications of refrigeration in technical processes such as the clarification of oils.

Production of Hydrogen

Dr. P. E. Raaschou contributed a paper entitled "Various Methods of Manufacturing Hydrogen." He first classified the methods at present in use under the three heads—(1) chemical methods such as from steam or from water gas, (2) liquefaction methods, as used by Claude and Linde to obtain hydrogen from water gas, and (3) electrolytic methods. He made in particular the comparison between the two principal chemical methods, the iron-steam process and the continuous water gas process.

In considering the relative economy of these two methods, the author illustrated this by means of summary estimates holding good for two plants, each plant producing 1,000 cu. metres per hour of a mixture of hydrogen and nitrogen in the proportion of 3 to 1. He mentioned that in the case of the iron-steam method, this gas mixture in the said proportion might be attained by the admission, together with the steam, of a slight quantity of air during the hydrogen period. His figures indicated, with unit prices assumed, that the cost of materials and labour would be slightly higher for the iron-steam method than for the continuous method. The advantages would increase with the size of the plants, and he was of the opinion that a plant according to the continuous method ought to have a minimum capacity of 2,000 to 3,000 cu. metres per hour, or a multiple of that capacity, out of regard to the generator plant, in order that the manufacture might be carried out economically.

Everything being taken into consideration, however, the probabilities were that for plants of the above-mentioned size the continuous method would be somewhat cheaper in operation than the iron-steam method.

Possible Uses of Liquid Air

Mr. O. Simonis, in a paper on "Liquid Air: Its Uses and Possibilities," pointed out that liquid air was not at present used to anything like the extent it might be, being mainly produced as an intermediate in oxygen manufacture. The cost could easily be reduced considerably below its present level. Its use might be developed in the pulverisation of rubber for the purposes of analysis, the prevention of chemical changes and freezing out of hydrocarbons from lighting gas, the refrigeration of foods, and so on. The chemical industry, he said, might find that the low temperature of liquid air retarded, if it did not totally prevent, some chemical changes which took place under ordinary temperature conditions. This property of low temperature might also find a useful application for the purpose of separating gases of different vapour pressures. Unfortunately, liquid air did not lend itself to use as a primary refrigerating agent owing to its low latent heat. It was clear that the application of the low temperatures of liquid air in refrigeration was strictly limited to those many problems which could not at present be solved with the ordinary refrigerating plant or with ice.

Dewaxing of Hydrocarbons

A paper on "Refrigeration as Applied to Dewaxing of Lubricants" was read by Mr. Leo D. Jones (U.S.A.), in which the author described a process for the removal of wax from petroleum lubricating stocks, which consisted in diluting the lubricating stock with naphtha, chilling to precipitate the wax, and removing the wax by a centrifugal machine.

In the fractionation of crude petroleum by distillation to separate it into naphtha, burning oils, and lubricating stocks, the wax, he pointed out, was concentrated in the lubricating fraction. This oil containing the wax was solid at ordinary temperatures, and frequently at as high as 110° F., and the wax must be removed to produce lubricants which would be fluid at working temperatures. The wax was invariably removed by refrigerating the oil under proper conditions to throw the wax out of solution, and then the precipitated wax was separated.

Early in the development of the centrifugal process it was found that the ease of separation of the wax and the completeness of wax removal from the oil was largely dependent upon a proper control and application of refrigeration to the diluted oil. In diluting the oil about 60 per cent. of naphtha and 40 per cent. of lubricating stock were used. The resultant mixture was a comparatively thin fluid at all temperatures encountered in the process. Before refrigeration, the mixture must be heated until a clear solution was obtained, and this ordinarily required a temperature of about 100° F. The mixture was then transferred to a tank equipped with brine circulating coils. In this tank the mixture was chilled at a uniform rate from 100° F. to −10° F. during 48 hours. Sufficient chilling surface was provided so that the required rate of chilling was obtained by an average temperature difference between the oil mixture and the brine of approximately 10° F. Means were provided for controlling the brine temperature, lowering it as the oil temperature was reduced. During the period of chilling the contents of the tank were gently agitated, either continuously or intermittently at hourly intervals.

When the mixture had reached a temperature of −10° F. it was passed through a centrifugal, which was continuously discharging wax and wax-free oil solution. A process operated as described would produce lubricants having solidification points or cold tests below 25° F.

The purpose of this method of chilling was to produce a coarse precipitate of wax holding a minimum of occluded oil and with a minimum of wax in a colloidal state, and, in consequence, the highest yield of the lowest cold test oil for the effort expended in refrigeration. A chilling period of not materially less than 48 hours was required for most lubricating stocks. If the precipitation were forced at a more rapid rate, a portion of the wax was precipitated in so finely divided a state that its removal was uncertain in the centrifugal machine, and high cold test oil was the result. Some lubricating stocks which showed less tendency to produce colloidal wax might be successfully chilled in 24 hours, but these were exceptional.

Hydrocarbons in Refrigeration

Dealing with "Hydrocarbons and their use in Refrigeration," Mr. A. Henning referred chiefly to the use of the paraffins, including propane, butane, pentane, and the hydrocarbon derivatives ethyl chloride and methyl chloride, as refrigerants, and discussed some recent discoveries relating to several of the halogen derivatives. The number of hydrocarbons discovered during the last sixty or seventy years, he said, was about 200, of which the following had been tried for refrigerating purposes, with varying results: propane, butane, pentane, "gasoline" (a mixture of the so-called "gasoline" hydrocarbons, pentane, hexane, heptane, etc.), and naphtha. Hitherto the results had not proved satisfactory, but this might be partly due to the machines being unsuitably designed for the special refrigerant. Engineers built machines more or less on lines to which they had been accustomed, and then blamed the new refrigerant for what was really a mechanical fault. If results had not been entirely satisfactory, the particular refrigerant should not be blamed, as most likely it would be found useful under certain circumstances. There was one very serious objection to these hydrocarbons, namely, that they were all highly inflammable, and a great amount of heat was given out during the burning. Another difficulty was that so many of these products were only obtainable in small or uncertain quantities. Ethyl chloride and methyl chloride were in general much more satisfactory than the various hydrocarbons, particularly ethyl chloride, which could be rendered non-inflammable.

The Cost of Living—(IX)

An Unsound Basis for Wage Settlements—Jobs for Men and Jobs for Machines —How Workers Can Secure Higher Pay

By Sir Ernest Benn

WHEN a man with a wife and five children is offered a job at £2 10s. a week, and the cost of food and other things that he requires to keep them alive is £3 a week, that man is in difficulties, and not unnaturally claims that his wages must be brought up to the minimum of £3. If that man's needs were the only question involved, it would be simple to arrange wage settlements in accordance with the cost of living index figure, but unfortunately other considerations arise. Wages and the cost of living have got mixed up in the public mind largely because, together, they make an appeal to sentiment. There is danger in allowing sentiment to enter into the study of the economic structure of society, for, whilst sentiment is proper in its place, it has nothing to do with economics, and it is of the utmost importance that we should first of all get our economics right, so that we many have sound bases upon which to indulge our sentiments.

The Vicious Circle

The cost of living has no more to do with wages than has the betting odds of the birth rate, and either figure would be just as scientific a basis for a wage settlement as the Board of Trade index figure. This is such an evident and elementary proposition that it is remarkable that it should ever be doubted. It can be reduced to the very simplest terms when it is remembered that there is a period between the payment of wages and the receipts for the results of labour; that that is a period requiring the employment of capital and that capital must cost money. Thus, if wages are raised £1, that £1 must be paid at some period before the goods resulting from the wages are sold and paid for. The extra price of the goods, therefore, will be £1 plus something.

An increase in wages without an increase of production must inevitably add more than the amount of the increase of wages to the cost of living. That is a proposition which has nothing to do with capitalism and nothing to do with private enterprise; it will be found to be absolutely true, whatever the system, or whatever the scheme of things. To raise wages because of the height of the cost of living index figure only results, therefore, in pushing that index figure up higher still and in increasing the disparity between the rate of wages and the cost of living. The more you press the argument, and the farther you continue the process, the wider becomes the gap between the two figures and you only increase your difficulties. There are, of course, cases where wages are too low—where the community as a whole is enjoying an undue advantage at the cost of a particular class of wage-earner—and in such cases, wages should be raised; but those cases have nothing whatever to do with the general argument that we are now considering, namely, that wages must be regulated according to the cost of living.

There are cases, too, where wages are not sufficient to allow a man to live and where they should not be raised. Starvation wages are one of the forces known to the science of economics for driving men out of unnecessary work. The sound rule in the matter is that if a job will not stand a living wage, it is not a man's job at all; it ought to be done by a machine, and to apply some altogether false remedy, such as the cost of living argument, to that job is merely to perpetuate an abuse, to hinder an advance and to condemn a man to the degrading position of carrying on a job which he ought not to be doing. Industrial advance consists in the replacement of human labour by machinery, a replacement which must continue to go on and must advance more and more rapidly if we are ever to secure a higher standard of living. The quickest way to get machinery into a job of work is to encourage the idea that it is below the dignity of a human being to do it.

A System which Hinders Development

I am not an expert in railway matters or in coal mining, but I have a suspicion that real progress in railway development and mining is being hindered by false thinking on this very question. Our railways, I venture to suggest, could be better worked with much less man-power that they now employ if modern science were allowed to have free play with them. The need for labour-saving devices is apparent all along every railway line. But this cost of living fetish creeps in, coupled with its fellow folly, the notion that work must be shared out, and the results is that the railways are doomed to employ large numbers of men in performing obsolete operations and thus are prevented from rendering that progressive service to the community which they otherwise might give. The same considerations seem to me to apply to coal mining.

Lest it should be thought that I am advocating the wholesale discharge of railway workers, I would add that I realise the difficulties. If any such operation as that suggested were carried out, there would be a period during which the discharged men would be in trouble until they could be absorbed in other industries. That is always a difficulty, but it should not blind us to the real economic position. Half the men rendering better service on more scientific lines would create a demand for far more service, would provide far better wages and would eventually lead to employment for far more men, and we ought to keep these considerations in mind so that we may understand, when consenting to uneconomic makeshifts like the cost of living argument, that they are uneconomic and that they are merely makeshifts.

Three Simple Sums

Real wages can only be increased out of extra production. If production is increased in proportion to an increase in wages, other charges remaining equal, the cost of goods and the cost of living go down. Through production, therefore, the worker stands to get added wages and cheaper goods and to gain at both ends. By increasing wages without increasing production, the worker loses at both ends, for the extra wages that he gets are more than balanced by the extra cost of the products that he has to buy.

This can be shown perhaps best by three little sums. We will assume that a given article costs £2 10s., and that the price is made up as follows:—

	£	s.	d.
Wages	1	0	0
Materials	0	10	0
Overheads of all descriptions	1	0	0
Total	2	10	0

Now double wages and double output, and the sum will read as follows:—

	£	s.	d.
Wages	2	0	0
Materials	1	0	0
Overheads	1	0	0
Total for *two* articles ..	4	0	0
and per article ..	2	0	0

Wages in this case have doubled, and the cost of living so far as it is affected by the article, is reduced by 20 per cent. Let us take the third sum. Suppose that we double wages and leave output stationary. Our sum then works out in the following way:—

	£	s.	d.
Wages	2	0	0
Materials	0	10	0
Overheads	1	0	0
Total for one article ..	£3	10	0

The question is far too complicated and has far too many sides to it to be disposed of in a simple calculation like this, but the consideration I have put forward are those which are all too frequently overlooked in discussions on these questions.

The cost of living has nothing whatever to do with the proper rates of wages and if that fact could be accepted and understood we should clear the issue and get along more rapidly. The cost of living is neither an argument for bringing down nor for lifting up wages. Wages might be very much higher than they are; they might continue to progress if only they could be definitely associated in our minds with the ideas of service and value.

Notes on a New Hydrogen Cell

The Knowles Patent Column Plant

A VERY serious drawback to the use of electrolytic cells for the production of hydrogen in large volumes has always been the great floor space required. Although many inventors have designed cells with a view to reducing the area occupied, the cost of housing electrolytic hydrogen producing plants of large capacity has always been a serious item of capital expense.

With the recent rapid developments in the synthetic ammonia industry, the hydrogenation of oils and fats and other similar processes, the question of floor space has been brought into special prominence, not only on account of the exceptionally large plant required but also because such plants have often to be installed where much expensive excavating work is necessary to provide a level area for the cell room. This is naturally so, as in nearly every case the source of power is hydro-electric and the site for the works is consequently nearly always in mountainous districts.

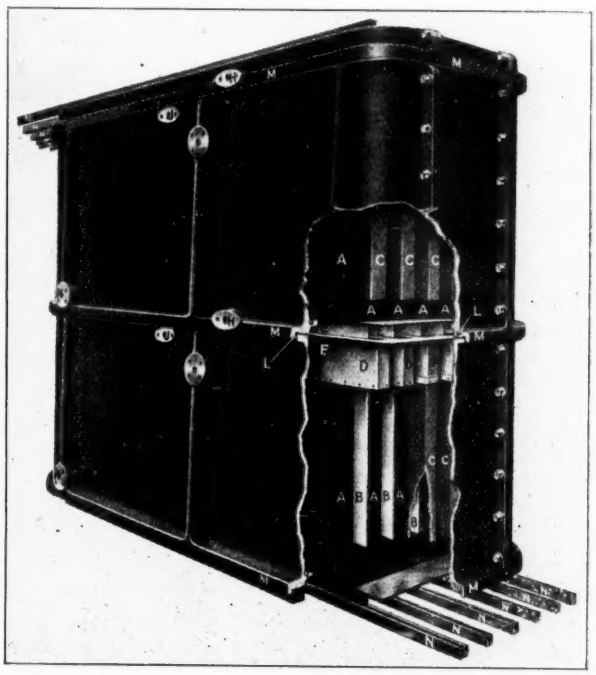
Previous to the design of the column type of cell, floor area has only been reduced by increasing the depth of the electrodes and running them at very high current densities, which seriously reduces the life of the cell and also increases its internal resistance, resulting eventually in a serious loss of efficiency. Even cells with exceptionally deep electrodes run at very high current densities do not enable the floor area to be very greatly reduced, and anything saved on the initial cost of the buildings is soon expended on the far greater cost of upkeep involved.

The Knowles column type plant, which is a very interesting cell, has electrodes of only moderate depth running at low current density and yet occupies only a fraction of the floor area required by other types of plant.

General Design

It will be seen from the sectioned photograph that the general design of each cell is similar in some respects to a bell type cell and does not depart in any way from the principles which are universally acknowledged to be best in electrolytic cell design. The superimposed arrangement adopted is, however, entirely novel and enables a plant of large capacity to be installed on an exceptionally small area. For the sake of clearness, the illustration shows only two cells, but in practice the cells can be erected ten high. The current passes directly from each cell to the cell above, without any external connections, the polarity being reversed as it passes from one cell to the next, and the only electrical connections required are to the bottom of the lowermost cell and to the cover of the upper cell of each column. Upstanding electrodes (A) on the base of one cell alternate with electrodes (B) hanging from the base of the cell above, and form the anodes and cathodes respectively of each cell unit. Asbestos diaphragms (C) suspended from the dividing or bell plate (D) surround the hanging electrodes and prevent the gases which collect in the spaces (E) and (F) from mixing. The containing tank, the inner surface of which carries an electrode, is built up of four iron castings bolted together and is of a specially rigid construction to carry the weight of the cells above. All the tanks in any particular plant are identical and interchangeable, so that any tank may be used for the bottom cell without risk of failure from the weight above. The base of the tank to which the electrodes are fixed rests on the projection (G) and is bolted to it to form an electrolyte-tight and gas-tight joint. Suitable electrolyte separators and vertical gas offtake pipes are coupled to (H) and (J), while make-up water is fed to the cells through (K). The tanks of adjacent cells are insulated from one another by special jointing rings (L), which also form a gas-tight joint and insulate the bell plate from both the tank above and below it. There is no possibility of a short circuit occurring between adjacent tanks as any electrolyte which may drip from a faulty pipe connection on the cell above falls clear from the projecting flange (M) when it reaches the bottom of the tank. Due to the weight of the cells and electrolyte, no holding down bolts are necessary to make the joint between the tanks gas-tight, and erection or dismantling therefore simply consists in lifting one cell complete with electrodes from the cell below. Straight copper bars (NN) bolted on both sides of lugs extending the whole length of the electrodes carry the current between the top cells and bottom cells of adjacent columns. It will at once be appreciated that the whole design is exceedingly simple and does not involve the use of any material liable to rapid deterioration.

The same quality iron plate which has proved so durable in the earlier pattern Knowles cell is also used for the electrodes in this cell, the section of the electrodes throughout being ample to carry the current for which the cell is designed without appreciable C^2R loss from the top to the bottom of the plate. The anodes, which in one column are the upstanding electrodes and in the next the depending plates, are treated with nickel by a special process which ensures entire freedom from corrosion and also reduces over-voltage. For the diaphragms, asbestos cloth of close weave and free from flaws, to ensure complete separation of the gases, is employed, and with ordinary care it is found in practice that the life of the material is not less than five years. Material chosen as the result of a long series of experiments for its lasting qualities and high insulation properties in the presence of caustic soda is used for the joints between the cells and the base plate and tank. Since the tank walls do not carry any current, the electrical conductivity of the cast iron used is unimportant and it is possible to use a quality specially suited to withstand large crushing stresses.



SEMI-SECTION OF THE KNOWLES PATENT COLUMN CELL.

It is not possible here to review all the features of the new cell, but as regards its principal merit, the saving of floor space, the following data may be given. Any comparison with regard to floor space must be made for cells running at the same efficiency, and the following table for a number of cells, chiefly of American design, has been prepared on this basis :

Type of Cell	Knowles Column	A.	B.	C.
Current	1,600	600	600	600
Efficiency, cb. ft. of H per kWh	7·22	7·22	7·22	7·22
Relative floor space	1	3·3	6·6	14·7
Relative Depth of Electrode	1	1·5	2·0	1·15
Relative Current Density	1	4·56	1	1·36

The cells considered are all in actual use, and in the majority of cases the makers claim they have been specially designed with a view to economy in floor space. It will be seen that for a 1,000 kW. plant generating 7,200 cb. ft. of hydrogen per hour, the Knowles column type cells occupy less than one-third of the area taken by any of them, despite the fact that the current density is low and the depth of the electrodes is less than any other considered, this being a substantial advantage for the new type.

C

French Chemical Industry Notes

[From Our Paris Correspondent.]

Some interesting figures relating to the French potash mines were communicated at the recent meeting of French chemists and agricultural officials at Bordeaux by M. de Retz, general manager of the Alsatian Potash Mines, and M. Vogt, manager of the Kali Saint-Thérèse mining group. Since the French engineers had taken over from the Germans, he said, very considerable progress had been made. When the Germans occupied Alsace the deposits there had been neglected in favour of the abundant supplies of potash to be found in Germany. Before the war the Germans had obtained from the Alsatian mines some 350,000 tons of raw salt. By 1919 the French had worked the total up to 600,000 tons, and doubled this in 1920, while in 1921 the output was 1,580,000 tons. The present daily capacity was estimated at 11,000 tons, and the management were hoping to increase this very shortly to 14,500 tons, or about 4,000,000 tons annually.

M. Le Cornec then gave some particulars of how this potash is distributed in France by the Société Commerciale des Potasses d'Alsace. The country has been divided up into eight areas, each of which is in charge of an expert, who lectures in the villages and encourages farmers to use potash fertilisers. These potash salesmen are to be provided with lorries, which in addition to carrying a supply of printed information will be capable of giving cinematograph demonstrations showing the advantages accruing from the use of potash in the soil.

"Monolastic" Paving

A new process for making roads known as the "Monolastic" was demonstrated to the chemists at the Bordeaux Congress by M. Ballan, who conducted a party round the factory of the Roads and Paving Co. This material is made from a finely and carefully ground mixture of sand and bitumen, the latter having been previously liquefied by the addition of petroleum oil and thickened a little with chalk. Some heating is required in the working up process, but the result is hard and elastic road-covering which has a particularly low coefficient of thermal expansion. The cost of making roads by this process is said to be about £3,000 per kilometre, against £500 for ordinary stone paving, but it is claimed that the increased durability more than offsets this initial expense.

Conclusion of the Meeting

The concluding days of the congress were devoted to a series of excursions and visits to places of chemical interest. These included a trip to a resin distillery at Moulleau, where Professor Du Pont, of the Pine Institute, conducted the party round the plant, which consists essentially of a Kestner steam-heated column and a vacuum apparatus. A large party also visited the wine centres and were entertained to a banquet by the owner of the Chateau-Yquem, where they had an opportunity of sampling the finest Sauterne, Barsac, and Graves wines.

A banquet at the Arachon Hotel at Bordeaux brought the proceedings to a close. It was generally conceded that this had proved one of the most useful and valuable congresses of its kind ever held in France, largely owing to the work of the Société de Chimie Industrielle, and in particular to its secretary, M. Gerard.

Prosperity in the Chemical Industry

Recent annual reports of French chemical concerns in many cases are distinctly favourable. For example, the Société Chimique des Usines du Rhône, which has a number of subsidiaries, announced in their report that one of these had recently been able to pay the arrears of dividends for several years, thanks to the technical success achieved. Then the Talcs de Luzenac are paying a considerably increased dividend, and the Weiger concern is paying 10 per cent. this year, their sales having shown a 15 per cent. increase on the previous year. The Société pour l'Industrie Chimique of Mulhouse are paying fr. 375 on each share of fr. 1,250, and are contemplating extending their plant and increasing their capital. Finally, the Société de Salpêtres et Produits Chimique of Bordeaux is about to make a new issue of shares, increasing its capital from fr. 600,000 to fr. 3,600,000.

Society of Glass Technology

Two Papers on Furnaces

The last meeting of the Society of Glass Technology for the session 1923–24 was held in Sheffield on June 18. Colonel S. C. Halse presided and two papers were presented.

(1) "*Some Remarks on the Erection and Operation of Modern Pot Furnaces,*" by Percival Marson. In the absence of the author this paper was read by Professor W. E. S. Turner, D.Sc. The author pointed out that the glass manufacturer, before constructing a pot furnace, which represented a heavy capital expenditure, should have adequate plans prepared. An efficient furnace builder should be able to guarantee his furnace, but it was desirable to have a technologist as intermediary in order that suitable specifications might be carried out. The builder should study the nature of the ground upon which the furnace was to be erected and should construct an adequate foundation, providing also any necessary drainage and protection of the flues from ingress of water. The provision of suitable flue dampers with some form of indicator allowed of a more accurate regulation of the furnace during working. A small hole in the furnace above one of the pots served to give an indication, by observation of the issuing flame, of the state of combustion, so that correct conditions could thereby be attained. For a "full crystal" glass a furnace temperature of 1,306° was sufficient and nothing was gained by exceeding this, but for soda-lime glass a temperature of 1,400° could be maintained with advantage. It was claimed that for the crystal glass a circular pot was better than an oval or egg-shaped one, since it was less likely to cause cords in the glass.

(2) "*Note on an Unusual Type of Recuperative Tank Furnace,*" by F. W. Hodkin, B.Sc., and Professor W. E. S. Turner, D.Sc. This paper was presented by Mr. Hodkin, who gave an account of observations made upon a recuperative tank furnace in operation at the Belinda Works of Lax and Shaw, Ltd., Leeds. The observations were made as the result of an invitation extended by Mr. J. S. Shaw to Professor Turner to inspect the furnace. The main feature was the method of recuperation of the secondary air. This air entered by arched passages situated beneath the bottom of the tank and above similar passages conveying the exit gases to the chimney flue. It then passed by means of vertical channels in the working end of the furnace to a space between an upper and a lower crown. After traversing the space between the crowns the air entered the furnace through a series of ports which were placed so as to have the gas ports between them. Producer gas was admitted, without preheating, through a gas-chamber connected with ports or burners opening into the melting end of the furnace. The flames traversed the whole length of the furnace, the products of combustion escaping through vertical downtakes in the working end to the flues beneath the tank.

The batch was charged through an opening at the side of the furnace, and one big advantage claimed for the method of construction was that it permitted working operations to be carried out along the walls, not only of the working end, but also of the melting end, by the use of syphons. The bridge had three walls separated by cavities through which steam was blown for cooling purposes. With gas at 700° C. and air at 720° C. the temperature of the glass in the melting end was 1,460° C. The production of glass from the tank, which was not being worked at full capacity, averaged 80 tons per week for a consumption of about 60 tons of coal on the producers. This glass was worked by three machines with feeders situated in the working end of the furnace, and by hands from four boots in the melting end. The designers anticipated a production of more than 120 tons of glass per week when working fully. The President intimated that a party of members of the Society was visiting Belgium from July 7 to 12.

Chemicals and Pest Prevention

Calcium cyanide dust has recently been used for the extermination of rabbits in Queensland. In the form of fine dust, said to be non-explosive, non-inflammable, and non-corrosive, it is blown through the main channels of the warrens. The deposit gives off hydrocyanic acid, and remarkably successful results have been obtained. Calcium cyanide had previously been used for this purpose in New South Wales, but by a different method.

From Week to Week

DR. ELLWOOD HENDRICK, of New York, has been appointed curator of the Chandler Chemical Mission at Columbia University.

SIR ALFRED MOND has been adopted by Carmarthen Division Liberal Association as prospective Liberal candidate for the next election.

A DEGREE OF M.Sc., in the Principles, History, and Method of Science, has been instituted for both internal and external students by the Senate of London University.

CELLULOSE EXPORTS from Finland during the month of May reached the record figure of 34,185 tons. This is the result of large sales by Finnish Cellulose Association.

SIR LEONARD LYLE, M.P. for Epping, and chairman of Tate and Lyle, Ltd., sugar refiners, has decided to retire from Parliament at the next election owing to pressure of business.

MR. HENRY WALKER, C.B.E., H.M. Inspector of Mines, has been appointed to the Board for Mining Examinations, in the place of Sir Thomas H. Mottram, C.B.E., who has retired.

THE CHIEF CHEMIST to the Bradford Corporation Sewage Works, Mr. J. A. Reddie, has been admitted a Fellow of the Institute of Chemistry. Mr. Reddie is a former student of Bradford Technical College.

DR. A. L. STERN, of Burton-on-Trent, a Fellow of the Institute of Chemistry and of the Chemical Society, is retiring after 34 years' service with Bass and Co., seventeen of which have been spent as head brewer.

DR. L. H. BAEKELAND, president of the American Chemical Society and honorary, professor of chemical engineering in Columbia University, has been made Commander of the Order of Leopold, by King Albert of Belgium.

KING'S COLLEGE, LONDON UNIVERSITY, has appointed Mr. H. W. Cremer, M.Sc., F.I.C., A.M.I.Chem.E., senior lecturer in chemistry; and Mr. E. W. McClelland, B.Sc. (Belfast), Ph.D. (Durham), A.I.C., a demonstrator in chemistry.

PROFESSOR SYDNEY CHAPMAN, M.A., D.Sc., F.R.S., Manchester University, has accepted the invitation of the governing body of the Imperial College of Science and Technology to undertake the Chief Professorship of Mathematics at the Imperial College.

MR. S. A. COURTAULD, a director of Courtauld's, Ltd., textile manufacturers, has given a donation of £20,000 to endow the University Professorship of Anatomy at Middlesex Hospital Medical School. Mr. Courtauld has been a generous supporter of the hospital for several years.

FIVE HUNDRED MEMBERS of the British Association for the Advancement of Science are to visit Toronto at the end of July to attend the annual meeting of the Association. Members will sail from Great Britain on July 25 and 26, and the main body will return to England on September 4, 5 and 6.

MR. J. A. PRESCOTT, of the Bahtim Experimental Station, Egypt, and a graduate of Manchester University, has been appointed to the Professorship of the Waite Research Institute. The Institute was founded as a gift by Mr. Peter Waite to further agriculture. The land, buildings, and shares are worth £150,000.

SIR RICHARD REDMAYNE, K.C.B., and Mr. Arthur M. Lamb have resigned from the Committee appointed to investigate the possible methods of reducing the number of accidents from falls of ground in coal mines. The Committee has been reappointed with Sir Thomas H. Mottram, C.B.E., as Chairman, with powers to superintend any research undertaken to that end.

THE POSITION OF PRINCIPAL of Northampton Polytechnic Institute, London, is vacant. Applications are invited from University graduates, or persons of equivalent standing, familiar with the training of engineers. Full details of the appointment can be obtained from W. K. Davis, Northampton Polytechnic Institute, Clerkenwell, E.C.1.

CAMBRIDGE APPOINTMENTS include the following as demonstrators of chemistry:—Mr. F. W. Dootson, of Trinity Hall; Mr. H. McCombie, of King's; Mr. W. G. Palmer, of St. John's; and Mr. A. J. Berry, of Downing. Mr. H. Thirkill, of Clare, has been appointed demonstrator of Experimental Physics, and Dr. C. H. Ellis, of Trinity, assistant demonstrator.

AN AGRICULTURAL CHEMIST is required for the Department of Agriculture, Nairobi, Kenya Colony. Applicants must possess a degree in chemistry and have specialised in agricultural chemistry, and possess ability to initiate and undertake research work if required. Full details can be obtained from the Private Secretary (Appointments), Colonial Office, Downing Street, S.W.1.

AWARDS MADE at Gonville and Caius College, Cambridge, on Thursday, June 27, include:—A. B. C. Cobban, B.A., re-elected to a Shuttleworth Studentship (Chemistry); I. F. D. Morrow, elected to a Wollaston Studentship (Physics); E. A. Guggenheim, B.A., elected to a Frank Smart Studentship (Biochemistry); and J. T. Irving, B.A., elected to a Shuttleworth Studentship (Chemistry).

WHEN THE HONORARY DEGREE of D.C.L. was conferred on Lieut.-Colonel Sir C. H. Bedford, at Oxford, on Thursday, June 26, the Public Orator (Dr. A. D. Godley) referred to him as being one of the foremost of those who had converted the discoveries of science to the service of humanity. He had been a distinguished student of chemistry and had rendered notable service in India.

DR. MARY EVELYN LAING, Lecturer in Physical Chemistry at Bristol University, has been awarded the Ellen Richards Research Prize of $1,000, for 1924, for a paper on "A General Formulation of Movement in a Magnetic Field: Migration, Electrophoresis, and Electro-osmosis of Sodium Oleate," which has led to an unexpectedly simple relation between the electrical behaviour of colloids and ordinary salts.

APPLICATION HAS BEEN MADE for the return to Germany of 131 persons, many of them laboratory chemists, who were expelled during the Ruhr disturbances last year. The German Deputy for the district, in appealing to the Inter-allied Rhineland Commission, says that these men are necessary for the maintenance of local plant. Many of them were employed by the Farbewerke Hoechst and the Badische Anilin und Sodafabrik concerns.

BRITISH MANUFACTURERS AND MERCHANTS interested in export trade to Czechoslovakia should note that Mr. E. C. Donaldson Rawlins, Commercial Secretary at Prague, will attend the Department of Overseas Trade from July 7 to 14, for the purpose of interviews on the subject. Applications for interviews should be addressed: Comptroller-General, D.O.T., 35, Old Queen Street, S.W.1 (Telephone, Victoria 9040, Extension 250.).

MR. VICTOR BLAGDEN, Chairman of the British Chemical and Dyestuffs Association and head of the firm of Victor Blagden and Co., heavy chemical manufacturers, of 4, Lloyd's Avenue, London, is at present on a business visit to America. He is making his headquarters at H. W. Peabody and Co., New York, the American selling agents of his company. Mr. Blagden, who arrived in New York on June 12, is expected to return during July.

THE FUND inaugurated by Leeds University to mark the great work of Professor Arthur Smithells during his thirty-eight years as Professor of Chemistry, has resulted in a Commission to Mr. Fiddes Watt, R.A., to paint a portrait of Professor Smithells for presentation to the University. The fund will also provide at least £2,000 for the endowment of the Scholarship at the University on conditions to be approved by Professor Smithells. Any further subscriptions to the fund, which will shortly be closed, may be sent to Treasurer, the Smithells Fund, Beechwood, Roundhay, Leeds.

A NEW CHEMICAL EXTINGUISHER for dealing with oil fires was demonstrated by Merryweather and Sons at their works this week. The machine carries ingredients for the production of a large quantity of "fire-suds," a thick semi-liquid foam holding in suspension carbonic acid gas, an effective antidote to burning oil, tar, or other substances bearing a lower specific gravity than water. The fire engine carries a galvanised steel tank holding a solution of bicarbonate of soda, with the "suds" producing material, and six separate lead-lined compartments carrying aluminium sulphate in solution. The two liquid ingredients are conveyed along separate lines of hose until they reach a single delivery branch, where they mix and form the "fire-suds," which are delivered under pressure on to the surface of the burning oil. The film quickly spreads over the surface, and, by preventing the access of oxygen, extinguishes the flames.

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Abstracts of Complete Specifications

216,580. EXTRACTING TIN FROM ITS ORES, PROCESS FOR. E. C. R. Marks, London. From American Smelting and Refining Co., 120, Broadway, New York. Application date, February 28, 1923.

The ore or tin-bearing material is crushed to relatively small size, and if it contains excessive sulphur is roasted to reduce the sulphur to less than 0·5 per cent. The ore is then mixed with a suitable binder such as granulated tin-slag or silica, also with limestone to combine with the sulphur remaining in the ore, and with fine coal to act as a reducing agent. The mixture is then sintered in a machine such as the Dwight and Lloyd machine, yielding a porous uniform product containing very small proportions of sulphur, traces of bismuth and antimony, calcium compounds, and a considerable quantity of stannous oxide.

The sintered product is mixed with iron-tin alloy and carbonaceous material such as coke, together with siliceous fluxes, limestone, and slag if necessary, and treated in a blast furnace of the water-jacketed type. The object of the smelting is to reduce the tin, to slag the iron, and decompose the alloy. The iron becomes oxidised, and unites with the silica as a slag together with some of the tin, but 80–90 per cent. of the total tin content is obtained by this smelting and may be run off.

The slag is subjected to a secondary smelting operation to form the iron-tin alloy referred to above. The slag is poured into a smelting furnace, and fine coal and limestone are added. The tin is reduced and some combines with the iron to form the alloy. The metal is separated, and the remaining slag contains not more than 1 per cent. of tin. This process avoids the formation of matte which occurs in the blast furnace treatment of tin ores, and it enables the iron-tin alloy obtained to be made use of in the process.

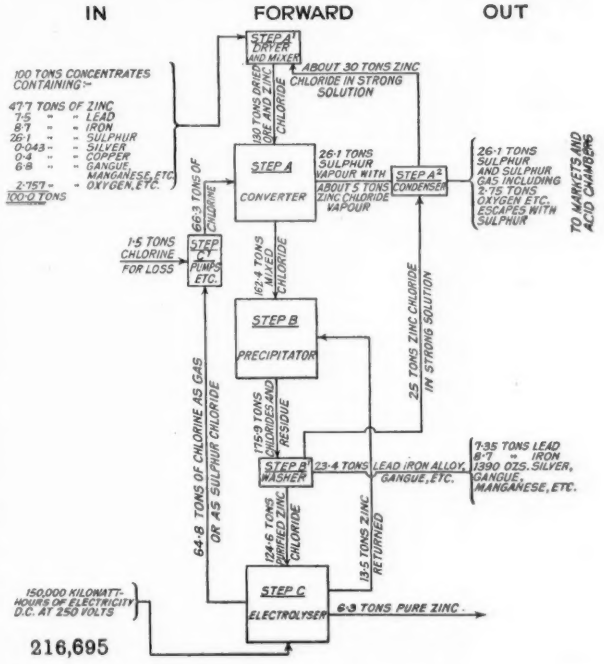
216,622. ALKYLATED AND ARALKYLATED DERIVATIVES OF VAT DYESTUFFS, MANUFACTURE OF. R. B. Ransford, London. From L Cassella and Co., G.m.b.H., Frankfurt-on-Main, Germany. Application date, March 28, 1923.

These derivatives are obtained from the vat dyestuffs which are produced by treating anthracene with sulphurising agents. The anthracene compounds are dissolved in alkaline vats, and treated with alkylating or aralkylating agents, *e.g.*, halogen alkyls, alkyl sulphates, halogenated fatty acids and their esters, benzyl halogenides; suitable aromatic quaternary ammonium compounds containing at least one aromatic residue such as trialkylnaphthyl or dialkyl benzylaryl ammonium salts may also be used. These new compounds are not oxidisable or changeable with alkaline hydrosulphite, and differ entirely from the colour of the primary materials. Some of these bodies are dyestuffs, and others may be used for producing new dyestuffs. They may also be produced on the fibre by dyeing it with the original dyestuffs and treating in the presence of alkaline reducing agents, *e.g.*, hydrosulphite or glucose, with the alkylating or aralkylating agents. The new products give blue, brown, black and grey shades. Several examples of the treatment of sulphurised anthracene dyestuffs by this process are given.

216,695. ZINC-LEAD SULPHIDES, ORES, MATTES, AND THE LIKE, TREATMENT OF. E. A. Ashcroft, 32a, Liverpool Street, London. Application date, June 2, 1923.

The process is for treating zinc-lead sulphide ores, concentrates, mattes, oxidised or sulphated ores, etc., containing zinc in substantial proportions, together with lead, iron, and other metals. The object is to obtain a purified zinc chloride, or zinc and lead chlorides, suitable for electrolysis. The raw material is first chlorinated with chlorine or sulphur chloride at about 600°–700° C. In the case of oxidised or sulphated ores, chlorine is used and the ore is mixed with sufficient carbon to combine with any oxygen in excess of that which combines with the sulphur. Any antimony, arsenic, or tin is volatilised and recovered, together with the sulphur dioxide. The fused mixture is treated with metallic zinc in quantity just sufficient to precipitate the iron and the whole or part of the lead, silver, and copper, which are deposited in the form of a granular alloy, which is solid at the temperature employed. The purified metal is separated from this alloy by decantation, and may then be electrolysed. The alloy may be smelted for the recovery of lead, silver, etc.

The electrolysis may be conducted in one operation, or fractionally. In the latter case, a relatively impure grade of



zinc containing the residue of lead, copper, and other impurities is first deposited and pure zinc is then deposited. If the material contains a substantial proportion of lead chloride, four fractions may be taken: (1) a fraction containing lead, silver, and impurities, (2) pure lead, (3) an alloy of lead and zinc, and (4) pure zinc. All the operations with molten zinc chloride are conducted at about 400°–450° C., as it is found that the melt is then sufficiently fluid without emitting fumes, and it does not attack iron or steel containing vessels. The chlorine liberated during the electrolysis is employed cyclically in the chlorination of further batches of concentrates. The sulphur liberated during the chlorination is condensed in zinc chloride solution having a specific gravity about 2·2, and heated to about 130° C. Any zinc chloride accompanying the sulphur is dissolved in the solution. The concentrated crude zinc chloride solution is periodically withdrawn and replaced by weaker solution obtained by washing the granular alloy referred to above. It is found that the presence of about 1–5 per cent. of manganese chloride in the melt is beneficial during the electrolysis, since it prevents the formation of basic compounds. Manganese chloride may therefore be added if not already present. If the raw material is chlorinated by sulphur chloride, the whole product is added to fused zinc chloride at about 400°–450° C., and the resulting "sulpho chloride" melt is then created with metallic zinc to precipitate the lead and iron, leaving purified zinc chloride for the electrolysis. An example of the treatment of commercial zinc concentrates is given and the diagram illustrates in the form of a flow sheet the treatment of the concentrates.

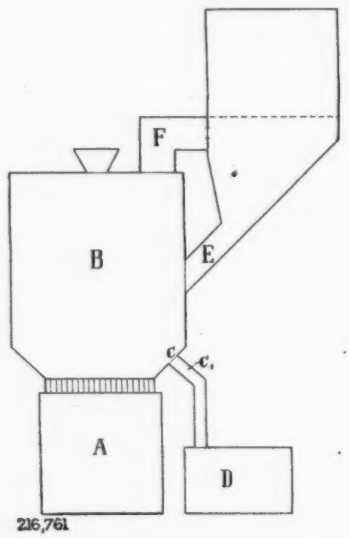
216,708. REMOVAL OF CONSTITUENTS FROM GASES. G. Schmies, Immenstaad, Bodensee, Baden, Germany, and Deutsche Luftfilter-Bauges, m.b.H., Mauerstrasse 83, Berlin. Application date, June 26, 1923.

The object is to treat a current of air or gas to free it from moisture and dust without opposing a considerable resistance to the current. A rigid network or conglomerate of inert material is coated with molten calcium chloride or other hygroscopic material, so that on solidifying a considerable

surface is exposed to the current of gas, but the resistance is not great. In one example, the network may be composed of iron wire mounted in flat rings or frames. The successive frames are turned relatively to one another so that helical passages for the gas are formed. In another example, a casing is filled with metal turnings or other material, coated with the fused absorbent. In another example, an endless band of network is moved so as to dip into a vessel containing the fused absorbent, the band travelling across the current of gas to be treated.

216,761. Active Carbon, Manufacture of. J. Y. Johnson, London. From Badische Anilin & Soda Fabrik, Ludwigshafen-on-Rhine, Germany. Application date, September 17, 1923.

Active carbon is made in an ordinary shaft furnace, thus avoiding the use of externally heated or revolving retorts. Fuel,



216,761

such as blue water gas, is burnt with air in a chamber A, and the hot gases pass upwards through small apertures of 5 mm. width into a furnace B. The apertures are formed in a plate of fireclay, which is covered by a layer 4 cm. thick of pieces of fireclay. The carbonaceous material may be coal, lignite, peat, brown coal, wood, etc., and is granulated and placed in the furnace B in a layer about 40 cm. thick. The carbon is given a whirling movement by the hot gases in the chamber B, and when the temperature reaches about 800° C. steam is blown into the chamber A. This mixture is allowed to act on the carbon for ten minutes, when the flue F is closed and the carbon is blown through a valve C and pipe C_1 to a chamber D which is filled with nitrogen or carbon dioxide. The carbon to be treated is supplied from a hopper E. The active carbon obtained is suitable for purifying gases from sulphuretted hydrogen by catalytic oxidation with air.

216,789. Electrical Precipitation of Suspended Particles from Gaseous Fluids. Lodge-Cottrell, Ltd., 51, Great Charles Street and Church Street, Birmingham. From Metallbank und Metallurgische Ges. Akt.-Ges., 45, Bockenheimer Anlage, Frankfurt-on-Main, Germany. Application date, November 6, 1923.

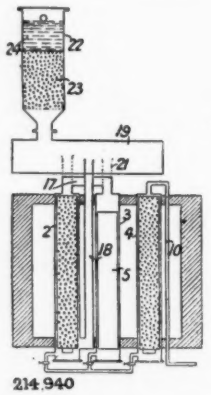
The apparatus is for vibrating the electrodes to remove the precipitated particles from them. A series of discharge wire electrodes are suspended from a horizontal frame, within collecting pipe-shaped electrodes. The precipitating chamber is provided with a membrane in its wall level with the electrode-supporting frame, and the outer side of the membrane is attached to the movable core of an electro-magnet. The inner side of the membrane is attached by an insulator to the electrode-supporting frame, and the frame is reciprocated to detach precipitated particles, by alternately energising and de-energising the electro-magnet. In an alternative form, the frame may be reciprocated vertically instead of horizontally.

Note.—Abstracts of the following specifications, which are now accepted, appeared in The Chemical Age when they became open to inspection under the International Convention :—194,289 (C. Harnist), relating to manufacture of disinfecting fertilisers from sulphur or metallic sulphides, see Vol. VIII., p. 520; 195,602 (Holzverkohlungs-Industrie Akt.-Ges.), relating to manufacture of hexamethylene tetramine, see Vol. VIII., p. 625; 197,940 (Durand and Huguenin Akt.-Ges.), relating to manufacture of mordant dyestuffs, see Vol. IX., p. 102; 199,004 (Aktieselskabet Dansk Svovlsyre and Super Phosphate Fabrik, and Dansk Aktieselskab Siemens Schuckert), relating to regulation of the oxidising agents, nitric acid, nitrate solution, etc., in the manufacture of sulphuric acid, see Vol. IX., p. 156; 208,114 (J. Michael and Co.), relating to manufacture of potassium nitrate, see Vol. X., p. 174.

International Specifications not yet Accepted

214,940. Benzene and other Hydrocarbons. G. Linnmann, 10, Alsterufer, Hamburg, Germany. International Convention date, April 24, 1923.

Material such as coal, peat, tar, fatty residues or oily residues obtained in the manufacture of benzol, lacquer, dyes,



214,940

turpentine, linoleum, etc., is heated and the vapour mixed with hydrogen and passed over a heated catalyst to obtain hydrocarbons such as benzene. A retort 4 is externally heated in a furnace, and steam superheated in the pipe 10 is passed through iron turnings in the retort to generate hydrogen. The material to be treated is contained in a vessel 5 in a retort 3, and the hydrogen is passed through it, the metal of the vessel 5 acting as the catalyst. The products pass through another heated retort 2 containing iron turnings, and then through a pipe 18 to the receiver 19. The products finally pass through iron turnings 23 and filter 24.

214,951. Calcium Arsenate. Soc. Chimique des Usines du Rhône, 21, Rue Jean-Goujon, Paris. International Convention date, April 27, 1923.

A suspension of calcium arsenite is mixed with chloride of lime; or with lime, and chlorine gas then passed through the mixture; or arsenious acid is mixed with excess of lime and water, and chlorine gas passed through. The product in each case is calcium arsenate, and it is separated from the solution of calcium chloride.

214,999. Hydrocyanic Acid. A. Dubois, Peseux, near Neufchatel, Switzerland. International Convention date, April 23, 1923.

Sulphocyanic acid and its salts or esters are vaporised and mixed with an oxygen containing gas at 350°–750° C., and passed through tubes of clay, silica, iron or aluminium, whereby the material is oxidised to hydrocyanic acid. If the sulphocyanogen compound is not volatile, its solution may be run into a vessel heated to a high temperature, so that sudden evaporation takes place and the compound is atomised; or superheated steam or air may be injected into the solution. The vapour carrying the sulphocyanogen compound is treated as before.

215,000. ALKYL SULPHATES. Ledoga Soc. Anon., and C. Maimeri, 11, Via Lazzaretto, Milan, Italy. International Convention date, April 23, 1923.

Dry ethylene is passed at a pressure of 15-25 atmospheres into monohydrated sulphuric acid heated to 55°-65° C. and agitated. The mixture is then poured on to ice, when ethyl sulphuric acid separates as an upper layer, and diethyl sulphate as a lower layer. The latter is dried and distilled.

215,007. DYES. Soc. of Chemical Industry in Basle, Switzerland. International Convention date, April 24, 1923.

A mixture of hydroquinone, aniline and water is treated with air at 20-25 atmospheres pressure for 40-60 hours, in an autoclave heated to 50° C. The product is 2 : 5-dianilidoquinone, which is filtered off. Other arylido-quinones are similarly obtained.

215,011. SILICA. Elektro-Osmore Akt.-Ges. (Graf Schwerin Ges.), 35, Lindenstrasse, Berlin. International Convention date, April 26, 1923.

To obtain amorphous silica, sufficient inorganic acid is added to water glass to neutralise half the soda. The total volume of the mixture should be 1·5-2 times the volume of the water glass. Either or both solutions may be diluted. The jelly is allowed to stand for 15-20 hours and is finally separated and washed with acid.

215,012. SULPHURISED PHENOL COMPOUNDS. Soc. Alsacienne de Produits Chimiques, 63, Boulevard Haussmann, Paris. International Convention date, April 27, 1923.

Phenol or a derivative or substitution product is heated with sulphur and iodine or other halogen, or sulphur halogen compound. The mixture is first heated to 190° C. and then to 250° C. till no more sulphuretted hydrogen is evolved. Excess of phenol and iodine are distilled off, and a vitreous product soluble in sodium carbonate solution is obtained, suitable for dyeing purposes.

215,021. DYES. Farbwerke vorm. Meister, Lucius, & Brüning, Hoechst-on-Main, Germany. International Convention date, April 28, 1923.

An oxythionaphthene acidylated in the sulphur-containing ring is treated with a halogen or halogenating agent, and the product saponified to obtain halogenated oxythionaphthenes. These may be oxidised to obtain halogenated thioindigos, and may be used in the preparation of asymmetric or indirubin dyestuffs. For example, naphthalene-2:3-thioglycolcarboxylic acid is boiled with acetic anhydride and sodium acetate, and a solution of bromine in acetic acid added. The solvent is distilled, and the product hydrolysed with caustic soda.

LATEST NOTIFICATIONS.

217,882. Manufacture of fuel alcohol and apparatus therefor. Henneberg, G., and Charpentier, M. H. June 20, 1923.

217,888. Process and apparatus for industrially removing the liquid medium from emulsion colloids. Pollak, Dr. F. June 22, 1923.

217,936. Manufacture of dyestuffs containing sulphur. Akt.-Ges, für Anilin-Fabrikation. June 23, 1923.

Specifications Accepted, with Date of Application

193,057. Metallic oxides, Method for reducing. D. W. Berlin, February 11, 1922.

203,714. Ultra filter membranes, Manufacture of. J. Duclaux. September 11, 1922.

204,052. Vulcanisation of indiarubber. Soc. Ricard, Allenet et Cie. September 15, 1922.

206,489. Isolation of urea. Soc. des Produits Azotes. November 3, 1922. Addition to 189,787.

210,462. Azo-dyestuffs from arylamides of 2:3-oxynaphthoic acid. Process of producing on the fibre. Chemische Fabrik Griesheim-Elektron. January 29, 1923.

213,886. Caoutchouc, Manufacture of. K. D. P., Ltd. April 5, 1923.

217,264. Centrifugal filter or separator. Lilleshall Co., Ltd., and C. A. Bishop. October 20, 1923.

217,376. Aluminium, silicon and other elements from aluminiferous substances such as clay or bauxite, Production of. L. D. Hooper. April 14, 1923.

217,414. Electrolytic processes. W. J. Mellersh-Jackson. (*Mathieson Alkali Works, Inc.*). May 28, 1923.

217,428. Rotary distillation retorts. G. E. Heyl. June 27, 1923.

217,467. Formic acid, Manufacture and production of. J. Y. Johnson. (*Badische Anilin & Soda Fabrik.*) August 20, 1923.

217,468. Recovery of soda from its solutions. W. M. Wallace. August 20, 1923.

217,469. Removal of free moisture from substances by centrifugal means. G. H. Elmore. (*R. C. Comley.*) August 21, 1923.

Applications for Patents

Akt.-Ges. für Anilin-Fabrikation. Manufacture of dyestuffs. 15,169. June 23. (Germany, June 23, 1923.)

Akt.-Ges. für Anilin-Fabrikation. Manufacture of tanning materials. 15,540. June 27. (Germany, June 29, 1923.)

Badder, H. C. Processes for evaporating and drying colloidal materials from solutions. 15,471. June 27.

Baker, T. Thorne-. Preparation of chemical substances for use in radiography. 15,130. June 23.

Bechhold, H. Manufacture of glue, etc. 15,410. June 26.

Breitenbach, A. Metallurgical furnaces. 15,330. June 25.

Carbide and Carbon Chemicals Corporation, and Marks, E. C. R. Process of combining ethylene with sulphuric acid. 15,455. June 26.

Carpmael, W., and Chemische Fabriken vorm. Weiler-Ter-Meer. Process for obtaining gases rich in ethylene. 15,436. June 26.

Cassella and Co. Ges., L., and Ransford, R. B. Production of arsenic acids. 15,260. June 24.

Cassella and Co. Ges., L. Production of arseno compounds. 15,528. June 27.

Chadburn, W. R. Purification of oils. 15,324. June 25.

Cutter, J. O., Drew, R. B., and Duncalfe, R. Manufacture of gelatin from bone, etc. 15,226. June 24.

Eagle Picher Lead Co. and Jackson, J. E. Evans-. Manufacture of basic lead sulphate. 15,461. June 26.

Ellis, G. B., and Haeffely, E. Manufacture of dyes for vegetable fibres. 15,529. June 27.

Green, A. G. Dyeing and printing. 15,374. June 26.

Karpen and Bros., S., and Wade, H. Manufacture of hexamethylenetetramine. 15,253. June 24.

Lockwood, A. A. Concentration or separation of minerals. 15,327. June 25.

Nash Engineering Co. Centrifugal pumps. 15,467. June 26. (United States, July 9, 1923.)

Shimadzu, G. Process of manufacturing lead oxide. 15,421. June 26.

Vains, A. R. de. Continuous manufacture of hydrate of chlorine. 15,599. June 28.

Vains, A. R. de. Continuous chlorination of cellulosic materials. 15,600. June 28.

Ammonia Oxidation in Russia

A BOOK has been published in Russia by the Scientific-Technical Division of the Supreme Council of National Economy entitled "The Contact Production of Nitric Acid." It would seem that in 1915-16 the Russians decided to put up an ammonia oxidation plant to convert the ammonia liquor obtained from the coke ovens in the Donetz basin to nitric acid. At first laboratory scale experiments were made with tubes 20 mm. in diameter, the semi-commercial scale tests were carried out in 90 mm. tubes, and the final plant consisted of 42 catalyst tubes 120 mm. in diameter each containing platinum gauzes 300 mm. in diameter. The difficulties encountered in the earlier experiments were mainly from melting of the iron catalysts, escape of the ammonia, and use of wrong proportions leading to the decomposition of ammonia to nitrogen. An efficiency of 94·9 per cent. is said to have been obtained eventually before production on a large scale was begun. One of the difficulties that had to be solved was the production of pure ammonia, which was done by decomposing ammonium salts with steam and lime and purifying the resultant gases with caustic soda. It is interesting to note that the optimum speed of the gases over the catalyst was found to be over 1 metre per second, the time of contact being as low as ·0005 second. With 6-8 per cent. ammonia and air, a nitric acid of 1·4 specific gravity was obtained. It may be added that at present this work is only available in Russia.

Ford Chemical Works

THE FORD MOTOR CO. in the United States is completing the erection of new chemical works at Iron Mountain, Michigan, and intends to start production immediately. The plant will have a capacity for handling 210 cords of wood daily, to be manufactured into by-products, and the ultimate output of the plant, it is said, will exceed that of any similar works in existence. Power will be furnished from a hydro-electric generating plant.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co. Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing those firms' independent and impartial opinions.*

London, July 3, 1924.

BUSINESS has been on the whole more active this week, and quite an improved volume of inquiry is in evidence. Prices in the main show little change and the tone is steady.

Export inquiry still keeps somewhat quiet, although there is an improvement from one or two markets.

General Chemicals

ACETONE.—The spot position continues firm and prices for forward are hardening; the spot price with little variation is round about £98 per ton.

ACID ACETIC is somewhat weak, with pure 80% at £46, with the usual difference for technical; the future outlook is uncertain.

ACID CITRIC maintains its firmness and is strong at 1s. 6½d. per lb., less 5%.

ACID FORMIC is stagnant and price is easy at £58 per ton for 85%.

ACID LACTIC is also inclined to be a shade easier and is quoted at £44 per ton for 50% by weight material.

ACID OXALIC.—This product is steady, and can be obtained at round about 4½d. per lb.

ACID TARTARIC maintains its firmness and is quoted at 1s. 1d. to 1s. 1½d. per lb., less 5%.

ALUM is in good request and is standing at £10 10s. per ton.

ARSENIC continues absolutely stagnant, and it is reported that business has been done at below £47 per ton.

BARIUM CHLORIDE continues only in moderate request and is fairly easy at £13 10s. per ton.

COPPER SULPHATE.—Only a moderate business is reported and price is unchanged.

CREAM OF TARTAR has been perhaps a better market and is quoted at £84 per ton, less 2½%.

CALCIUM CHLORIDE.—The seasonable demand is quite fair and the material is offered at round about £5 per ton.

EPSOM SALTS is firm and more business is passing to home trade makers, it being increasingly difficult to secure imported material; the average value may be taken as £5 per ton.

FORMALDEHYDE.—The recent easiness in price has ceased and the market is quite steady to-day at £55 per ton.

LEAD ACETATE continues in good request and is offered at £48 per ton for white, with brown at about £44 per ton; quite a substantial business has been entered on forward account.

POTASSIUM CARBONATE is quiet and is quoted at about £25 per ton for 96%.

POTASSIUM BICHROMATE.—British makers announce a reduction to 5½d. per lb., less 5% for contracts.

POTASSIUM PERMANGANATE is fairly active, but price is inclined to be unsteady; the material is quoted at 8d. per lb.

POTASSIUM PRUSSIATE.—Demand has improved and the market is firm at 8¼d. to 8½d. per lb.

SODIUM ACETATE is weak, and is in poor demand; business has been done at about £23 10s. to £23 15s.

SODIUM BICHROMATE.—British makers announce a reduction of ¼d. per lb. for contracts, making the price 4¼d., less 5%.

SODIUM HYPOSULPHITE.—Business has been fairly active, although a certain amount of competition is in evidence. Commercial is standing at £9 10s. to £9 15s. per ton.

SODIUM NITRITE is quite active and in good demand; price is firm at £27 10s. per ton.

SODIUM PRUSSIATE.—Demand has improved, and to-day's value may be taken at between 4¼d. to 4½d. per lb.

SODIUM SULPHIDE.—An active demand is reported without change in value.

ZINC SULPHATE is weak but in buyers' favour at £13 10s. per ton.

Coal Tar Intermediates

Trade has been uneventful during the current week and prices in the main are without change.

ALPHA NAPHTHOL has been moderately active and is quoted at 2s. 3d. per lb.

ALPHA NAPHTHYLAMINE.—Some inquiry is reported, and the market is steady at 1s. 5d. per lb.

BENZIDINE BASE.—Only a small trade has been in evidence and the price is without change.

BETA NAPHTHOL is moderately active, and is quiet at 1s. 1d. per lb.

"H" ACID has been a fairly bright spot and business has been done on the basis of 4s. 3d. per lb., 100%.

NITRO BENZOLE is weak with little business passing.

PARANITRANILINE is fairly quiet, but some export enquiry is in evidence; price is 2s. 3d. per lb.

PARAPHENYLENEDIAMINE is quiet and is quoted at 10s. 3d. per lb.

Coal Tar Products

There is little change in the market for coal tar products since last weeek.

90% BENZOL is steady at 1s. 6½d. to 1s. 7d. per gallon on rails.

PURE BENZOL is inactive, and is worth about 1s. 11d. per gallon on rails.

CREOSOTE OIL continues to be in poor demand, with values declining. The price to-day is from 6½d. to 6¾d. per gallon in the North, while the price in London is from 7½d. to 7¾d. per gallon.

CRESYLIC ACID is unchanged at 2s. 1d. per gallon on rails for the Pale quality 97/99%, while the Dark quality 95/97% is worth about 1s. 9d. per gallon on rails.

SOLVENT NAPHTHA is steady at 1s. 1d. to 1s. 2d. per gallon on rails.

HEAVY NAPHTHA is quoted at 1s. 2d. per gallon on rails.

NAPHTHALENES are weak, the low qualities being worth from £5 10s. to £6 per ton; 74/76 melting point, £6 10s. to £7 per ton; and 76/78 melting point, £7 to £7 10s. per ton.

PITCH remains a dull market with values nominally unchanged.

Sulphate of Ammonia

SULPHATE OF AMMONIA.—The export demand is improving. Prices are maintained.

Gretna Glycerin Plant

IN view of the approaching sale of the Gretna factories, the possibilities of the ether plant and the glycerin distillery at Eastriggs are under consideration. These are the only two buildings which have not been dismantled and cleared of plant. Although the former is capable of distilling ether in much larger quantities than would be required, there is a possibility of great importance in the adaption of the plant for the manufacture of commercial alcohol. The glycerin distillery, which can produce nearly 50 tons a day, includes in its apparatus storage accommodation for 3,000 tons, a ferric sulphate plant, and two double stills.

AT BOW COUNTY COURT on June 27 Mr. Abram Simon, of 29, Coborn Road, Bow, sued the Millwall Engineering Co., Ltd., of Reliance Works, Glengal Road, Millwall, to recover £50, arrears of salary. Mr. Simon was appointed manager of the Millwall Engineering Co. at a salary of £700, and subject to deductions of amounts received from the Standar Chemical Engineering Co., and the Maximon Co. in connection with work done for them. The defendants intimated that Mr. Simon had left their employ in January last, and that he must look to the Standar Chemical Engineering Co. for his money as he had since been working for them and the Maximon Co. The Judge endorsed this view, and gave judgment for the defendants, with costs.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at sellers' works.

General Heavy Chemicals

All grades of Boric Acid have been reduced by £3 per ton as from June 11. Borax prices remain unchanged. Prices remain generally steady.

Acid Acetic 40% Tech.—£23 10s. per ton.
Acid Boric, Commercial.—Crystal, £45 per ton. Powder, £47 per ton
Acid Hydrochloric.—3s. 6d. to 6s. per carboy d/d., according to purity, strength and locality.
Acid Nitric 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.
Acid Sulphuric.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations: 140° Tw., Crude Acid, 65s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.
Ammonia Alkali.—£6 15s. per ton f.o.r. Special terms for contracts.
Bleaching Powder.—Spot, £11 d/d.; Contract, £10 d/d. 4 ton lots.
Bisulphite of Lime.—£7 per ton, packages extra.
Borax, Commercial.—Crystal, £25 per ton. Powder, £26 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)
Calcium Chloride.—£5 17s. 6d. per ton d/d.
Methylated Spirit 64 O.P.—Industrial, 3s. 1d. to 3s. 5d. per gall. Mineralised, 4s. 2d. to 4s. 6d. per gall., in each case according to quantity.
Potash Caustic.—£30 to £33 per ton.
Potassium Bichromate.—5¾d. per lb.
Potassium Chlorate.—3d. to 4d. per lb.
Salammoniac.—£32 per ton d/d.
Salt Cake.—£3 10s. per ton d/d.
Soda Caustic, Solid.—Spot lots delivered, £16 7s. 6d. to £19 7s. 6d. per ton, according to strength; 20s. less for contracts.
Soda Crystals.—£5 5s. to £5 10s. per ton ex railway depots or ports.
Sodium Acetate 97/98%.—£24 per ton.
Sodium Bicarbonate.—£10 10s. per ton carr. paid.
Sodium Bichromate.—4½d. per lb.
Sodium Bisulphite Powder 60/62%.—£18 to £19 per ton according to quantity, f.o.b., 1-cwt. iron drums included.
Sodium Chlorate.—3d. per lb.
Sodium Nitrate refined 96%.—£13 5s. to £13 10s. per ton ex Liverpool. Nominal.
Sodium Nitrite 100% basis.—£27 per ton d/d.
Sodium Sulphide conc. 60/65.—About £14 10s. per ton d/d.
Sodium Sulphide Crystals.—£9 per ton d/d.
Sodium Sulphite, Pea Crystals.—£15 per ton f.o.r. London, 1-cwt. kegs included.

Coal Tar Products

Prices in this section remain unaltered.

Acid Carbolic Crystals.—6½d. to 6¾d. per lb. Better inquiry. Crude 60's, 1s. 9d. to 1s. 10d. per gall. Market flat, only odd lots being offered.
Acid Cresylic 97/99.—2s. 1d. to 2s. 3d. per gall. Demand still good. Market firm. Pale 95%, 1s. 10d. to 1s. 11d. per gall. Steady demand. Dark, 1s. 8d. to 1s. 11d. per gall. Steady business.
Anthracene Paste 40%.—4d. per unit per cwt. Nominal price No business.
Anthacene Oil, Strained.—9½d. per gall. Very quiet. Unstrained. 8½d. to 9d. per gall.
Benzol.—Crude 65's.—10½d. to 1s. per gall. ex works in tank wagons. Standard Motor, 1s. 4½d. to 1s. 6d. per gall. ex works in tank wagons. Pure, 1s. 8½d. to 1s. 10d. per gall. ex works in tank wagons.
Toluol.—90%, 1s. 5½d. per gall. Pure, 1s. 10d. to 2s. per gall.
Xylol Commercial.—2s. 3d. per gall. Pure, 3s. 3d. per gall.
Creosote.—Cresylic 20/24%, 9d. to 9½d. per gall. Few inquiries. Middle Oil, Heavy and Standard Specification, 6¾d. to 9d. per gall. according to grade and district. Market very quiet.
Naphtha.—Crude, 8d. to 9d. per gall. Solvent 90/160, 1s. 4d. to 1s. 5d. per gall. Market steady. Solvent 90/190, 1s. 1d. to 1s. 4d. per gall. Fair business passing.
Naphthalene Crude.—Drained Creosote Salts, £6 to £6 10s. Demand falling off. Whizzed or hot pressed, £9 to £12 per ton. More inquiry.
Naphthalene.—Crystals and Flaked, £16 to £17 per ton.
Pitch.—Medium soft, 52s. 6d. to 57s. 6d. per ton. No export business at present. Plenty of inquiries for next season.
Pyridine.—90/160, 21s. to 22s. per gall. Market less firm. Heavy, 12s. to 12s. 6d. Market steady.

Intermediates and Dyes

Business in dyestuffs has been fairly good and has shown a little further improvement during the past week. Prices remain unaltered.

In the following list of Intermediates delivered prices include packages except where otherwise stated.

Acetic Anhydride 95%.—1s. 6d. per lb.
Acid H.—4s. 3d. per lb. 100% basis d/d.
Acid Naphthionic.—2s. 4d. per lb. 100% basis d/d.
Acid Neville and Winther.—5s. 8d. per lb. 100% basis d/d.
Acid Salicylic, technical.—1s. 1½d. to 1s. 2d. per lb. Better demand at reduced prices.
Acid Sulphanilic.—9½d. per lb. 100% basis d/d.
Aluminium Chloride, anhydrous.—1s. per lb. d/d.
Aniline Oil.—7¾d. to 8½d. per lb. naked at works.
Aniline Salts.—7¾d. to 9d. per lb. naked at works.
Antimony Pentachloride.—1s. per lb. d/d.
Benzidine Base.—4s. 6d. per lb. 100% basis d/d.
Benzyl Chloride 95%.—1s. 3d. per lb.
p-Chlorphenol.—4s. 3d. per lb. d/d.
p-Chloraniline.—3s. per lb. 100% basis.
o-Cresol 19/31° C.—4½d. per lb. Demand steady.
m-Cresol 98/100%.—2s. 1d. to 2s. 3d. per lb. Demand moderate.
p-Cresol 32/34° C.—2s. 1d. to 2s. 3d. per lb. Demand moderate.
Dichloraniline.—3s. per lb.
Dichloraniline S. Acid.—2s. 6d. per lb. 100% basis.
p-Dichlorbenzol.—£75 per ton.
Diethylaniline.—4s. 9d. per lb. d/d., packages extra, returnable.
Dimethyaniline.—2s. 4d. per lb. d/d. Drums extra.
Dinitrobenzene.—9d. per lb. naked at works.
Dinitrochlorbenzol.—£84 10s. per ton d/d.
Dinitrotoluene.—48/50° C. 8d. to 9d. per lb. naked at works. 66/68° C. 1s. 2d. per lb. naked at works.
Diphenylamine.—3s. per lb. d/d.
Monochlorbenzol.—£63 per ton.
B-Naphthol.—1s. 1d. per lb. d/d.
a-Naphthylamine.—1s. 4½d. per lb. d/d.
B-Naphthylamine.—4s. per lb. d/d.
m-Nitraniline.—5s. 3d. per lb. d/d.
p-Nitraniline.—2s. 4d. per lb. d/d.
Nitrobenzene.—5½d. to 5¾d. per lb. naked at works.
o-Nitrochlorbenzol.—2s. per lb. 100% basis d/d.
Nitronapthalene.—11¾d. per lb. d/d.
p-Nitrophenol.—1s. 9d. per lb. 100 % basis d/d.
p-Nitro-*o*-amido-phenol.—4s. 6d. per lb. 100% basis.
m-Phenylene Diamine.—4s. 2d. per lb. d/d.
p-Phenylene Diamine.—10s. 3d. per lb. 100% basis d/d.
R. Salt.—2s. 6d. per lb. 100% basis d/d.
Sodium Naphthionate.—2s. 5d. per lb. 100% basis d/d.
o-Toluidine.—8½d. per lb.
p-Toluidine.—3s. 6d. per lb. naked at works.
m-Toluylene Diamine.—4s. 6d. per lb. d/d.

Wood Distillation Products

All prices keep fairly stable, but there is room for improvement in business.

Acetate of Lime.—Brown, £14 10s. per ton d/d. Demand active. Grey, £19 to £20 per ton. Fair demand. Liquor, 9d. per gall. 32° Tw.
Charcoal.—£7 5s. to £9 per ton, according to grade and locality. Demand below normal.
Iron Liquor.—1s. 7d. per gall. 32° Tw. 1s. 2d. per gall. 24° Tw.
Red Liquor.—10d. to 1s. per gall. 14/15° Tw.
Wood Creosote.—2s. 7d. per gall. Unrefined.
Wood Naphtha, Miscible.—5s. per gall. 60% O.P. Market dull. Solvent, 5s. 6d. per gall. 40% O.P. Fairly good demand.
Wood Tar.—£5 per ton.
Brown Sugar of Lead.—£49 per ton.

Rubber Chemicals

Antimony Sulphide.—Golden, 5¾d. to 1s. 4d. per lb., according to quality. Crimson, 1s. 3d. to 1s. 6d. per lb., according to quality.
Arsenic Sulphide, Yellow.—1s. 1d. per lb.
Barytes.—£3 10s. to £16 15s. per ton, according to quality.
Cadmium Sulphide.—3s. 9d. per lb.
Carbon Bisulphide.—£24 to £26 per ton according to quantity.
Carbon Black.—6¼d. to 6¾d. per lb. Market firmer.
Carbon Tetrachloride.—£55 per ton, drums free.
Chromium Oxide, Green.—1s. 3d. per lb.
Indiarubber Substitutes, White and Dark.—4¾d. to 6¼d. per lb. Demand very brisk. Prices likely to remain steady owing to firmness of rapeseed oils.
Lamp Black.—45s. per cwt., barrels free. Dearer.
Lead Hyposulphite.—7¼d. per lb.
Lithopone, 30%.—£22 10s. per ton.
Mineral Rubber "Rubpron."—£15 10s. per ton f.o.r. London.
Sulphur.—£10 to £12 per ton, according to quality.
Sulphur Chloride.—3d. per lb., carboys extra.
Thiocarbanilide.—2s. 6d. per lb.
Vermilion, Pale or Deep.—4s. 10d. per lb. Easier.
Zinc Sulphide.—7½d. to 1s. 8d. per lb., according to quality

Pharmaceutical and Photographic Chemicals

The demand is steady for small quantities required for home consumption, but export inquiry for larger bulk is wanting.

Acid, Acetic 80% B.P.—£47 per ton.
Acid, Acetyl Salicylic.—3s. 3d. Value and demand maintained.
Acid, Benzoic B.P.—3s. 6d. per lb. Larger supplies available, market easier.
Acid, Boric B.P.—Crystal £51 per ton, Powder £55 per ton. Carriage paid any station in Great Britain. Prices reduced by £3 per ton.
Acid, Camphoric.—19s. to 21s. per lb.
Acid, Citric.—1s. 6½d. per lb., less 5% for ton lots. Market extremely firm. Upward tendency.
Acid, Gallic.—3s. per lb. for pure crystal. Market very steady.
Acid, Pyrogallic, Crystals.—7s. per lb. for 1 cwt. lots. Market firm; increasing demand.
Acid, Salicylic.—Prices quoted from 2s. per lb. down to 1s. 7d. for ton lots. Market still weak. Keen competition and smaller demands.
Acid, Tannic B.P.—3s. per lb. Market quiet.
Acid, Tartaric.—1s. 1½d. to 1s. 2d. per lb., less 5%. Better tone, but not yet very active. Cheap offers of second-hand parcels of foreign acid. Higher prices expected in view of firmness of raw materials.
Amidol.—9s. per lb. d/d.
Acetanilide.—2s. 3d. per lb. for quantity. Demand slow. Prices shaded to secure large orders.
Amidopyrin.—13s. 3d. per lb. Neglected. Stocks low.
Ammonium Benzoate.—3s. 3d. to 3s. 6d. per lb. according to quantity.
Ammonium Carbonate B.P.—£37 per ton.
Atropine Sulphate.—12s. 6d. per oz. for English make.
Barbitone.—15s. per lb. Quiet market.
Benzonaphthol.—6s. per lb. Small inquiry.
Bismuth Salts.—A steady market. Prices according to quantity.
Bismuth Carbonate.—12s. 9d. to 14s. 9d. per lb.
Bismuth Citrate.—11s. 4d. to 13s. 4d. per lb.
Bismuth Salicylate.—10s. 2d. to 12s. 2d. per lb.
Bismuth Subnitrate.—10s. 9d. to 12s. 9d. per lb.
Borax B.P.—Crystal £29, Powder £30 per ton. Carriage paid any station in Great Britain.
Bromides.—Fluctuating market. Continental prices decidedly firmer. Potassium, 11d. per lb.; sodium, 1s. per lb.; ammonium, 1s. 1d. per lb.
Calcium Lactate.—Demand active. Good English make can be had from 1s. 7d. to 2s. 6d. per lb.
Chloral Hydrate.—3s. 7d. to 3s. 9d. per lb., duty paid.
Chloroform.—2s. per lb. for cwt. lots. Market more active. Makers busy.
Creosote Carbonate.—6s. 6d. per lb. Little demand.
Formaldehyde.—£55 per ton, ex works. English make.
Glycerophosphates.—Fair business passing. Calcium, soluble and citrate free, 7s. per lb.; iron, 8s. 9d. per lb.; magnesium, 9s. per lb.; potassium, 50%, 3s. 6d. per lb.; sodium, 50%, 2s. 6d. per lb.
Guaiacol Carbonate.—11s. per lb. for cwt. lots. Slightly cheaper.
Hexamine.—3s. 6d. per lb. for English make. Market quiet and steady.
Homatropine Hydrobromide.—30s. per oz.
Hydrastine Hydrochloride.—English make offered at 120s. per oz.
Hydroquinone.—4s. 3d. per lb. in cwt. lots. Foreign make.
Hypophosphites.—Calcium, 3s. 6d. per lb. for 28 lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.
Iron Ammonium Citrate B.P.—2s. 1d. to 2s. 5d. per lb., according to quantity. Advanced by 2d. per lb.
Magnesium Carbonate.—Light Commercial, £36 per ton net.
Magnesium Oxide.—Light Commercial, £75 per ton, less 2½%; Heavy Commercial, £26 per ton, less 2½%; Heavy Pure, 2s. to 2s. 2d. per lb., according to quantity. Steady market.
Menthol.—A.B.R. recrystallised B.P., 52s. 6d. per lb. Weaker. Synthetic, 26s. to 35s. per lb., according to quantity. English make. Steady demand.
Mercurials.—Market firm. Red oxide, 5s. 3d. to 5s. 4d. per lb.; Corrosive sublimate, 3s. 6d. to 3s. 7d. per lb.; white precipitate, 4s. 7d. to 4s. 8d. per lb.; Calomel, 3s. 11d. to 4s. per lb.
Methyl Salicylate.—2s. to 2s. 3d. per lb. for carboys. Not much demand.
Methyl Sulphonel.—26s. per lb.
Metol.—11s. per lb. British make.
Paraformaldehyde.—3s. per lb. More inquiry.
Paraldehyde.—1s. 4d. to 1s. 6d. per lb. in free bottles and cases, according to holder and quantity.
Phenacetin.—6s. per lb. Ample stocks available.
Phenazone.—7s. per lb. for cwt. lots. Quiet.
Phenolphthalein.—6s. 6d. per lb. Easier, with supplies more plentiful.
Potassium Bitartrate 99/100% (Cream of Tartar).—88s. per cwt., less 2½% for ton lots. Firm market. Prices have upward tendency.
Potassium Citrate.—1s. 10d. to 2s. 2d. per lb. Dearer.
Potassium Iodide.—16s. 8d. to 17s. 5d. per lb., according to quantity. Demand continues.
Potassium Metabisulphite.—7½d. per lb., 1-cwt. kegs included.
Potassium Permanganate.—B.P. crystals, 8¾d. to 9d. per lb., carriage paid; commercial, 8d. to 8¼d. per lb., carriage paid.
Quinine Sulphate.—2s. 3d. to 2s. 4d. per oz., in 100 oz. tins. Steady market.
Resorcin.—5s. 6d. per lb. Sales slow.
Saccharin.—63s. per lb. in 50-lb. lots.
Salol.—3s. 6d. to 3s. 11d. per lb. Easier in sympathy with other salicylates.
Silver Proteinate.—9s. 6d. per lb.
Sodium Benzoate, B.P.—2s. 9d. per lb. In quantity for British product.
Sodium Citrate, B.P.C., 1923.—1s. 11d. to 2s. 2d. per lb., according to quantity. Firmer in common with other citrates.
Sodium Hypophosphite, Photographic.—£13 to £15 per ton, according to quantity, d/d. consignee's station in 1-cwt. kegs.
Sodium Metabisulphite Crystals.—37s. 6d. to 60s. per cwt., net cash, according to quantity.
Sodium Nitroprusside.—16s. per lb. Less for quantity.
Sodium Potassium Tartrate (Rochelle Salt).—77s. 6d. to 81s. 6d. per cwt., according to quantity. Market quiet.
Sodium Salicylate.—Powder, 2s. 2d. to 2s. 6d. per lb. Crystal, 2s. 5d. to 2s. 8d. per lb. Flake, 2s. 9d. to 2s. 10d. per lb. Market more active.
Sodium Sulphide, pure recrystallised.—10d. to 1s. 2d. per lb., according to quantity.
Sodium Sulphite, anhydrous, £27 10s. to £28 10s. per ton, according to quantity, 1 cwt. kegs included. In large casks £1 per ton less.
Thymol.—15s. 9d. to 17s. 6d. per lb. for good white crystal from ajowan seed. Very firm and scarce.

Perfumery Chemicals

Acetophenone.—12s. 6d. per lb.
Aubepine.—14s. 6d. per lb.
Amyl Acetate.—2s. 9d. per lb.
Amyl Butyrate.—6s. 9d. per lb. Cheaper.
Amyl Salicylate.—3s. 3d. per lb.
Anethol (M.P. 21/22° C.).—4s. 6d. per lb.
Benzyl Acetate from Chlorine-free Benzyl Alcohol.—2s. 10½d. per lb. Cheaper.
Benzyl Alcohol free from Chlorine.—2s. 10½d. per lb.
Benzaldehyde free from Chlorine.—3s. 6d. per lb.
Benzyl Benzoate.—3s. 6d. per lb.
Cinnamic Aldehyde Natural.—15s. 6d. per lb.
Coumarin.—20s. per lb.
Citronellol.—16s. per lb.
Citral.—10s. per lb.
Ethyl Cinnamate.—15s. per lb.
Ethyl Phthalate.—3s. 3d. per lb. Reduced.
Eugenol.—10s. 6d. per lb. Cheaper.
Geraniol (Palmarosa).—35s. per lb.
Geraniol.—11s. to 18s. 6d. per lb.
Heliotropine.—7s. per lb. Advanced.
Iso Eugenol.—15s. 9d. per lb.
Linalol ex Bois de Rose.—26s. per lb. Cheaper.
Linalyl Acetate.—26s. per lb. Cheaper.
Methyl Anthranilate.—9s. 6d. per lb.
Methyl Benzoate.—6s. per lb.
Musk Ambrette.—43s. per lb. Cheaper.
Musk Xylol.—16s. 6d. per lb. Reduced.
Nerolin.—4s. 9d. per lb. Advanced.
Phenyl Ethyl Acetate.—12s. 6d. per lb.
Phenyl Ethyl Alcohol.—16s. per lb.
Rhodinol.—57s. 6d. per lb.
Safrol.—1s. 10d. per lb.
Terpineol.—2s. 4d. per lb. Cheaper.
Vanillin.—24s. to 24s. 9d. per lb. Price reduced, demand steady.

Essential Oils

Almond Oil, Foreign S.P.A.—15s. 6d. per lb.
Anise Oil.—2s. 8d. per lb. Cheaper.
Bergamot Oil.—19s. 6d. per lb. Dearer.
Bourbon Geranium Oil.—36s. 6d. per lb. Advanced.
Camphor Oil.—75s. per cwt.
Cananga Oil, Java.—10s. 6d. per lb.
Cinnamon Oil, Leaf.—6½d. per oz.
Cassia Oil, 80/85%.—8s. 9d. per lb. Cheaper.
Citronella Oil.—Java, 85/90%, 6s. per lb. Again dearer. Ceylon, 3s. 9d. per lb.
Clove Oil.—7s. 3d. per lb. Cheaper.
Eucalyptus Oil, 70/75%.—2s. 2d. per lb.
Lavender Oil.—French 38/40% Esters, 27s. 6d. per lb.
Lemon Oil.—3s. 2d. per lb.
Lemongrass Oil.—3d. per oz.
Orange Oil, Sweet.—13s. 9d. per lb.
Otto of Rose Oil.—Bulgarian, 27s. 6d. per oz. Anatolian, 23s. 6d. per oz.
Palma Rosa Oil.—19s. per lb.
Peppermint Oil.—Wayne County, 20s. 9d. per lb. Cheaper. Japanese, 15s. 6d. per lb. Cheaper.
Petitgrain Oil.—10s. per lb.
Sandal Wood Oil.—Mysore, 26s. 6d. per lb. Australian, 21s. per lb.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

Glasgow, July 2, 1924.

THERE is no change to record since our last report, but now that the stocktaking period for the majority of works is past, an improvement in business is hoped for within the next week or two.

Prices both for home and Continental products remain unchanged.

Industrial Chemicals

ACID ACETIC.—Glacial, 98/100%, £60 to £70 per ton; 80% pure, £49 to £50 per ton; 80% technical, £46 to £47 per ton. All packed in casks delivered c.i.f. U.K. ports, duty free.

ACID BORACIC.—Crystal or granulated, £45 per ton; powdered, £47 per ton, carriage paid U.K. stations, minimum ton lots.

ACID CARBOLIC, ICE CRYSTALS.—Rather better enquiry, now quoted 6½d. per lb., carriage paid or f.o.b. U.K. port.

ACID CITRIC B.P. CRYSTALS.—Quoted 1s. 6¼d. per lb., less 5% ex store, spot delivery. Offered for early delivery at 1s. 5¾d. per lb., less 5% ex wharf.

ACID FORMIC, 85%.—Quoted £55 10s. per ton, ex wharf, prompt shipment from the Continent. Spot lots on offer at about £62 per ton, ex store.

ACID HYDROCHLORIC.—In little demand. Price, 6s 6d. per carboy, ex works.

ACID NITRIC.—80°, £23 10s. per ton, ex station, full truck loads.

ACID OXALIC.—On offer at 4¼d. per lb., ex store, spot delivery.

ACID SULPHURIC.—144°, £3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. De-arsenicated quality, 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—Quoted 1s. 2¼d. per lb., less 5% ex store, spot delivery. Offered for prompt shipment at about 1s. 1¾d. per lb., less 5% ex wharf.

ALUMINA, SULPHATE—17/18% IRON FREE.—Spot lots available at about £7 15s. per ton, ex store. Offered for early delivery at about £7 2s. 6d. per ton c.i.f. U.K. port.

ALUM, CHROME.—Ammonium chrome alum quoted £19 to £21 per ton according to quality, f.o.b. U.K. port. Potash chrome alum on offer at £26 per ton, ex store.

ALUM POTASH (LUMP).—Spot lots now available at £9 15s. per ton, ex store. Offered from the Continent at £8 15s. per ton, c.i.f. U.K. port.

AMMONIA ANHYDROUS.—Unchanged at 1s. 5½d. per lb., ex station, spot delivery. Moderate enquiry for export.

AMMONIA CARBONATE.—Lump, £37 per ton; powdered, £39 per ton, packed in 5 cwt. casks, delivered U.K. port.

AMMONIA LIQUID, 880°.—Unchanged at 2½d. to 3d. per lb. delivered, according to quantity. Containers extra.

AMMONIA MURIATE.—Grey galvanisers quality quoted £30 per ton ex station. Fine white crystals offered from the Continent at £25 per ton, c.i.f. U.K. port.

AMMONIA SULPHATE.—25½%, £13 12s. per ton; 25¾% neutral quality, £14 15s. per ton, ex works, prompt delivery.

ARSENIC, WHITE POWDERED.—Practically no demand. Spot lots quoted £52 per ton, ex store, but could probably be obtained for less.

BARIUM CARBONATE, 98/100%.—Quoted £11 10s. per ton, c.i.f. U.K. port, prompt shipment from the Continent.

BARIUM CHLORIDE, 98/100%.—English material quoted £14 5s. per ton, ex store. On offer from the Continent at £13 7s. 6d. per ton, c.i.f. U.K. port.

BARYTES.—Finest English white quoted £5 5s. per ton, ex works. Continental about £5 per ton, c.i.f. U.K. port.

BLEACHING POWDER.—Spot lots £11 per ton, ex station. Contracts, 20s. per ton less.

BORAX.—Granulated, £24 10s. per ton; crystals, £25 per ton; powdered, £26 per ton, carriage paid U.K. stations, minimum ton lots.

CALCIUM CHLORIDE.—English material unchanged at £5 12s. 6d. per ton, ex station. Offered from the Continent at about £5 per ton, c.i.f. U.K. port.

COPPERAS, GREEN.—Unchanged at about £2 5s. per ton, f.o.b. U.K. port, in bulk. Quoted, £3 5s. to £3 10s. per ton in casks.

COPPER SULPHATE.—On offer at £23 10s. per ton, f.o.b. U.K. port for export.

FORMALDEHYDE, 40%.—Spot lots on offer at £57 per ton, ex store. Offered for prompt shipment at £54 per ton, c.i.f. U.K. port.

GLAUBER SALTS.—English material unchanged at £4 per ton, ex store or station. Continental quoted £3 8s. per ton, ex wharf, spot delivery.

LEAD, RED.—Imported material inclined to be higher at about £37 10s. per ton, ex store.

LEAD, WHITE.—Quoted £43 15s. per ton, ex store, spot delivery.

LEAD, ACETATE.—White crystals now on offer at £46 15s. per ton, ex store, spot delivery; quoted £46 per ton, c.i.f. U.K. port, prompt shipment from the Continent.

MAGNESITE, CALCINED.—English material quoted £8 per ton, ex station, prompt delivery.

MAGNESIUM CHLORIDE.—Quoted £3 10s. per ton, c.i.f. U.K. port, prompt shipment. Spot lots available at £3 17s. 6d. per ton, ex store.

MAGNESIUM SULPHATE (EPSOM SALTS).—English material quoted £4 15s. per ton, ex store, spot delivery. B.P. quality on offer at about £6 5s. per ton, ex station.

POTASH CAUSTIC, 88/92%.—Spot lots now quoted £29 10s. per ton, ex store. On offer from the Continent at £28 10s. per ton, c.i.f. U.K. port.

POTASSIUM BICHROMATE.—Manufacturers advise reduction in price of ¼d. per lb.; now 5½d. per lb., delivered.

POTASSIUM CARBONATE, 96/98%.—Quoted £25 10s. per ton, ex store, spot delivery. On offer from the Continent at about £23 15s. per ton, c.i.f. U.K.

POTASSIUM CHLORATE.—Now quoted 2¾d. per lb., ex store.

POTASSIUM NITRATE (SALTPETRE).—Moderate enquiry, spot lots available at £30 per ton, ex store. Offered from the Continent at £27 per ton, c.i.f. U.K. port.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Quoted 8½d. per lb., ex store, spot delivery. On offer from the Continent at 7d. per lb., c.i.f. U.K. port.

POTASSIUM PRUSSIATE (YELLOW).—Now on offer at 8d. per lb. f.o.b. U.K. port.

SODA CAUSTIC, 76/77%.—£19 7s. 6d. per ton; 70/72%, £17 17s. 6d. per ton; 60/62%, broken, £19 2s. 6d. per ton; 98/99%, powdered, £22 15s. per ton; all ex station spot delivery. Contracts 20s. per ton less.

SODIUM ACETATE.—Quoted £24 10s. per ton ex store, spot delivery. On offer from the Continent at about £22 10s. per ton, c.i.f. U.K.

SODIUM BICARBONATE.—Refined recrystallised quality, £10 10s. per ton, ex quay or station, M.W. quality, 30s. per ton less.

SODIUM BICHROMATE.—Manufacturers advise reduction in price of ¼d. per lb. Now 4¼d. per lb. delivered.

SODIUM CARBONATE.—Soda crystals, £5 to £5 5s. per ton, ex quay or station. Alkali 58%, £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—English material unchanged at £10 per ton, ex station. Continental on offer at £9 15s. per ton, ex store, spot delivery. Offered for early delivery at £8 12s. 6d. per ton, c.i.f. U.K. port. Pea crystals of English manufacture quoted £13 15s. per ton, ex station.

SODIUM NITRATE.—95/96% quality quoted £13 10s. per ton, f.o.r. or f.o.b. U.K. port; 96/98%, 7s. 6d. per ton extra.

SODIUM NITRITE, 100%.—On offer at £27 per ton, ex store.

SODIUM PRUSSIATE (YELLOW).—Quoted 4½d. per lb., ex station or f.o.b. U.K. port.

SODIUM SULPHATE (SALTCAKE).—Price for home consumption, £3 10s. per ton, carriage paid buyers' station; good inquiry for export and price about £3 per ton, f.o.b. U.K. port.

SODIUM SULPHIDE.—60/62%, solid of English manufacture, £14 15s. per ton, ex station; broken, £1 per ton more; flake, £2 per ton more; 60/62%, solid, offered from the Continent at £12 5s. per ton, c.i.f. U.K. port; broken £1 per ton more; 31/34% crystals of English manufacture, £9 2s. 6d. per ton, ex station; 30/32% crystals of Continental manufacture, quoted £8 10s. per ton, c.i.f. U.K.

SULPHUR.—Flowers, £10 per ton; roll, £9 per ton; rock, £9 per ton; ground, £8 per ton. Prices nominal.

TIN CRYSTALS.—Unchanged at about 1s. 3½d. per lb., f.o.b. U.K. port.

ZINC CHLORIDE, 96/98%.—English makers' price unchanged at about £27 5s. per ton, f.o.b. U.K. port; 98/100% quality offered from the Continent at £24 10s. per ton, c.i.f. U.K. port.

ZINC SULPHATE.—Quoted £13 10s. per ton, ex station. On offer from the Continent at about £11 5s. per ton, c.i.f. U.K. port.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

ALPHA AMIDO ANTHRAQUINONE.—Export inquiry. Price, 30s. 9d. per lb., f.o.b.

ACE NAPTHENE.—Some export inquiry. Price, 4s. per lb.

BENZIDINE BASE.—Export inquiry. Price, 4s. 6d. lb., 100% basis, f.o.b.

BETA NAPHTHYLAMINE.—Price remains firm at 4s. per lb.

BENZYL CHLORIDE.—Export inquiry. Price, 1s. 8d. per lb., f.o.b., drums included.

BETA OXY NAPHTHOIC ACID.—Export inquiry. Price, 9s. per lb.

CARBAZOL.—Some inquiry. Price, 1s. 6d. per lb., 100% basis.

DI ETHYL ANILINE.—4s. 7d. per lb., quoted for export.

DINITROBENZOL.—Export inquiry. Price, 10d. per lb., f.o.b.
DIMETHYLANILINE.—Good export inquiries. Price, 2s. 3½d. per lb., f.o.b.
ETHYL BENZYL ANILINE.—6s. per lb., f.o.b., drums included Quoted for export.
J ACID.—12s. 9d. per lb., 100% basis. Quoted for export.
META NITRANILINE.—Export inquiry. Price, 5s. 3d. per lb.
META NITRO PARA TOLUIDINE.—Export inquiry. Price, 8s. 2d. per lb., 100% basis, f.o.b.
PERI ACID.—Some export inquiries. Price, 3s. per lb., f.o.b.
PARA NITRO ORTHO AMIDO PHENOL.—Small export inquiry. Price, 4s. 2d. per lb., f.o.b.
PARA PHENYLENE DIAMINE.—Export inquiry. Price, 10s. 3d. per lb., 100% basis.
R. SALT.—2s. 6d. per lb., 100% basis. Quoted for export.
S.S. ACID.—Small export inquiry. Price, 14s. per lb., 100% basis, f.o.b.
SCHAEFFER SALT.—3s. 5d. per lb., 100% basis. Quoted f.o.b. for export.
TOBIAS ACID.—Export inquiry. Price, 5s. 2d. per lb., 100% basis

The Manchester Chemical Market

[FROM OUR OWN CORRESPONDENT.]

Manchester, July 3, 1924.

THE past week has witnessed little change in the condition of the chemical market here. Business is still quiet although the slight improvement recorded during the last week or two has been maintained. The demand on home trade account is largely confined to spot delivery. Export business, chiefly for the colonies, is of moderate dimensions; Continental demand keeps very slow. On the whole prices are held at recent levels, although here and there concessions have been made since last report.

Heavy Chemicals

Chlorate of soda is moving in moderate quantities and quotations are steady at from 2½d. to 2¾d. per lb. Prussiate of soda is easy although no quotable change from last week can be reported; current value is about 4½d. per lb., with demand still quiet. Saltcake is attracting little notice from home users and export inquiry is not very formidable; export business is quoted at £3 per ton, with a premium of 10s. to home users. Sulphide of sodium is fairly steady at £14 10s. per ton from 60-65 per cent. concentrated solid and £9 5s. per ton for crystals. Bleaching powder is unchanged at £10 per ton, but the demand continues on a small scale. Caustic soda is selling fairly satisfactorily and quotations are firm; 60 per cent. material is quoted at £16 17s. 6d. per ton and 76-77 per cent. at £19 7s. 6d. Hyposulphite of soda is dull at £14 10s. per ton for photographic crystals and £9 5s. to £9 10s. per ton for crystals. Glauber salts are quiet but unchanged at round £3 10s. per ton. Alkali meets with a quietly steady demand both for home consumption and for shipment; values are steady at £6 15s. per ton. Acetate of soda is moving rather slowly at £23 per ton. Bichromate of soda is in moderate inquiry at 4½d. per lb. Phosphate of soda fails to arouse much buying interest although values still range from £13 10s. to £14 per ton. Soda crystals are quiet but steady at £5 5s. per ton. Bicarbonate of soda meets with a fair demand at £10 10s. per ton.

Both caustic potash and carbonate of potash are quieter and values are easier. Caustic is quoted at about £29 per ton for 90 per cent. strength, and carbonate at about £23 10s. Bichromate of potash is in quiet demand and the price has been reduced this week to 5½d. per lb. Chlorate of potash is in moderate request at 2¾d. per lb. Prussiate of potash is quiet with an easy tendency at 7¾d. per lb. Permanganate of potash is attracting limited attention at 6¾d. to 7¾d. per lb.

Arsenic continues to sell very slowly and values are again weaker. White powdered, Cornish makes, is now offering at round £49 per ton, Manchester. Sulphate of copper is also a quiet section of the market and current quotations are easy at £24 10s. per ton, f.o.b. Grey acetate of lime is on offer at about £18 5s. per ton, and brown at £13 10s., but buying interest is restricted. Commercial Epsom salts are in fair demand and values are maintained at £4 10s. to £4 15s. per ton; magnesium sulphate, B.P., is still quoted at £6 10s. Acetate of lead is quiet but steady at £47 10s. for white and £45 10s. per ton for brown. Nitrate of lead is unchanged in position or value at about £43 10s. per ton.

Acids and Tar Products

Trade in oxalic acid is still very quiet and quotations are weak at about 4¾d. per lb. Tartaric and citric acids are steady and in fair inquiry at 1s. 2d. to 1s. 2½d. and 1s. 6d. per lb. respectively. Acetic acid still meets with a moderate demand; values are about unchanged from last week at £47 per ton for 80 per cent. technical and about £70 per ton for glacial.

Pitch keeps very dull and values are more or less nominal at round £3 per ton, Manchester. Naphthalenes are attracting little attention although quotations keep fairly steady at about £16 10s. per ton for refined and £5 and upwards for crude qualities. Carbolic acid is quiet at 6¾d. to 7d. per lb. for crystals and 1s. 9d. per gallon for crude material. The demand for creosote oil is only moderate and prices easy at round 7d. per gallon. Solvent naphtha is quiet and easy at 1s. 4d. per gallon.

Chemical Matters in Parliament

Companies Acts

Mr. Baker (House of Commons, June 26) asked the President of the Board of Trade whether, in view of the fact that companies controlling subsidiary companies were able by increasing or decreasing transfers from their subsidiaries to disguise their real position in regard to profits and reserves, he would consider the necessity of introducing legislation to compel such companies to publish the profits and financial position of what were, in reality, simply departments of one business.

Mr. Alexander said the matter had already been noted for consideration when the revision of the Companies Acts was undertaken.

Reparation Dyestuffs

Mr. Baker (House of Commons, July 1) asked the President of the Board of Trade whether he would state the method by which reparation dyestuffs were distributed in this country.

Mr. Webb, President of the Board of Trade, said Reparation dyestuffs were distributed by the British Dyestuffs Corporation as agents, and under the direction of the Board of Trade, which fixed the prices, with the assistance of an informal committee on which the consumers of dyestuffs were represented. Details as to the quantities of dyestuffs received from time to time were immediately notified to the Colour Users' Association, and such quantities reserved for a period of seven days for actual users; afterwards they were available to all buyers.

Sir Frederic Wise asked whether the Dominions participated in this dyestuffs' distribution.

Mr. Webb asked for notice, and said of course they came in after some seven days, anyhow.

Lime Burning Industry

Sir A. Sinclair (House of Commons, July 1) asked the Secretary for Scotland whether he would consider restarting the industry of lime-burning at the kiln at Loch Eriboll, Sutherland, on property belonging to the Crown, with a view to supplying crofters and smallholders in the district with lime at cost price for the fertilisation of their holdings, and of providing employment.

Mr. Adamson said that on present information he was not satisfied that there would be such a demand for the lime at an economic price as would justify the Board in incurring the cost of restoring and starting this kiln.

Electrolytic Soda in Italy

REPORTS to the U.S.A. Bureau of Foreign and Domestic Commerce state that there were two manufacturers of electrolytic soda in Italy prior to the war, one employing the old diaphragm process and the other using the Kellner-Solvay mercury process. The industry expanded rapidly during the war, due to the increased demand for chlorine and for caustic soda by the manufacturers of explosives. The daily production at present is 83 tons of caustic soda and 68 tons of chlorine. Five large plants and a number of small ones are in operation. The domestic and export demand for chlorine has increased since the war, in the form of calcium hypochlorite. Italy is obliged to import large quantities of caustic soda chiefly from France, but imports also from the United States, Spain and Great Britain.

Company News

B. LAPORTE, LTD.—The dividend on the preference shares, for the six months ended June 30 last, was paid on that date.

RECKITT AND SONS, LTD.—The directors announce that the quarterly dividend has been increased from 8d. to 9d. per share.

THE LAUTARO NITRATE CO., LTD.—The company are offering for sale at par £1,500,000 6½ per cent. first mortgage debenture stock.

JOHNSON, MATTHEY AND CO., LTD.—A general meeting of the holders of the debenture stock will be held at 78, Hatton Garden, London, E.C.1, on July 10 at 3 p.m.

TARMAC, LTD.—An interim dividend of 1s. per share, free of tax, has been declared on the ordinary shares for the six months to June 30 last, being at the rate of 10 per cent. per annum.

THE PREMIER OIL CO.—At an extraordinary general meeting held on June 25, the resolutions passed at the meeting on June 10 placing the company into voluntary liquidation were duly confirmed.

JOSEPH NATHAN AND CO.—The directors have decided to postpone the declaration of the interim due on July 1, on the 7 per cent. "A" preference shares, until the results of the trading for the year ended June 30 are definitely ascertained.

NEW TRANSVAAL CHEMICAL CO., LTD.—Interim dividends for the half-year to December 31, last, of 3 per cent., less tax, on the cumulative first preference shares, and of 4 per cent., less tax, on the cumulative "A" preference shares have been declared.

IDRIS HYDRAULIC TIN, LTD.—The profit for the year, 1923, after providing for depreciation, amounted to £10,980, which, with £7,658 brought in, makes a total of £18,638. The annual meeting will be held at Portland House, 73, Basinghall Street, London, on July 8, at 3 p.m.

MOND NICKEL CO., LTD.—A final dividend is recommended on the ordinary shares at the rate of 1s. 6d. per share, less tax, making 2s. 6d. per share (12½ per cent.), less tax, for the year to April 30 last. For the previous twelve months 10 per cent. was paid, including an interim of 2½ per cent.

CHLORIDE ELECTRICAL STORAGE CO.—The net profits for the year ended March 31 last were £115,542, and £33,016 was brought forward. A final dividend of 5 per cent. and a bonus of 10 per cent. are proposed, making 20 per cent., free of tax, for the twelvemonth, adding £50,000 to reserve and £6,000 to the employees' benefit fund, leaving £44,888 to be carried forward.

ALLEN-LIVERSIDGE, LTD.—The report of the directors for the six months ended April 30 last, states that the trading has resulted in a net profit of £25,077 to which must be added the balance brought forward of £4,719 and the premium received on the issue of 20,000 shares £1,000, making £30,796. The directors place to general reserve £5,000, to reserve against patents and development account £5,000, and to reserve against freehold and leasehold properties £1,000, and recommend a dividend at the rate of 12½ per cent. per annum, less tax, being 6¼ per cent., less tax, for the half-year, £14,842, leaving to be carried forward £4,954. The annual meeting will be held at Victoria Station House, Westminster, London, on July 10 at noon.

COURTAULDS, LTD.—The directors have decided to pay an interim dividend in respect of the year 1924 of 1s. per share, and a bonus of 3d. per share, free of income tax. They have placed a value of £16,013,629 on 85,014,900 shares they hold in the American Viscose Corporation, or £8,209,608 more than the amount at which they stood in the book when the 1923 accounts were made up. The board propose to add this increment to the reserve fund, and to increase the capital from £12,000,000 to £20,000,000 by the capitalisation of £8,000,000 of the reserve. They recommend that 8,000,000 5 per cent. cumulative preference shares of £1 each be created, and that two fully paid preference shares be allotted for every three shares now held. The new shares will rank for dividend from July 1 next.

BRITISH OXYGEN CO., LTD.—The directors recommend a final dividend for the year, to March 31 last, of 1s. 9d. per share, free of tax, payable on July 10 to holders registered on the books on that day, making, with the interim dividend of 9d. per share, free of tax, a total of 2s. 6d. per share, equivalent to 12½ per cent. The report for the year to March 31 last states the profit, after providing for debenture interest and redemption, depreciation, etc., amounted to £150,278. The directors are of the opinion that to ensure provision for further developments of the company's business, it is desirable that the authorised capital should be increased from £500,000 to £1,000,000, and an extraordinary resolution to effect this increase will be submitted at the general meeting to be held at the Great Eastern Hotel, Liverpool Street, on July 10, at noon.

New Chemical Trade Marks

Applications for Registration

This list has been specially compiled for us by Mr. H. T. P. Gee, Patent and Trade Mark Agent, 51 and 52, Chancery Lane, W.C.2, from whom further information may be obtained.

Opposition to the registration of the following Trade Marks can be lodged up to August 2, 1924.

"FRAVMITE."

447,210. For calcium oxalate and oxalic acid. The Bhopal Produce Trust, Ltd. (a company incorporated under the laws of Bhopal State, Central India), Chandbur, Bhopal, Bhopal State, Central India, manufacturers. April 7, 1924.

"KALBINAMEL."

448,483. For preservative paint. Callender's Cable and Construction Co., Ltd., Hamilton House, Victoria Embankment, London, E.C.4, electrical engineers. May 19, 1924.

"CERAMOID."

448,603. For red lead. Brussell Brothers and Baker, Ltd., 15, Seething Lane, London, E.C.3, merchants. May 22, 1924.

"KEMOLIM."

447,298. For hydrated lime in use for the manufacture of paint. Harvie Linton and Co., Ltd., 11, Queen Victoria Street, London, E.C.4, merchants. April 9, 1924.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

SULPHURIC ACID, CARBONATE OF SODA, ETC.—A firm of manufacturers' agents with offices in Sydney is desirous of getting into touch with manufacturers, with a view to securing sole Australian representation of sulphuric acid, carbonate of soda, essences of all kinds, colourings, carbonate of magnesia, sulphate of magnesia, or any other article used in the manufacture of syrups and aerated waters. Replies to be addressed in the first instance to the Agent-General for New South Wales, Australia House, Strand, W.C.2. (Reference No. 356/5.)

VARNISH GUMS FOR SPAIN.—A commission agent in Barcelona is desirous of securing the representation of a British exporter of varnish gums. (Reference No. 20.)

Bisgood v. Catalytic Chemical Co.

A MOTION for judgment in default of appearance, in the debenture holder's action, Bisgood *v.* The Catalytic Chemical Co., Ltd., was before Mr. Justice Tomlin in the Chancery Division on Friday, June 27. Mr. Draper, for the plaintiff, said that the company was incorporated in 1921, and issued first and second mortgage debentures, the plaintiff being the holder of a number of the former. Several judgments had been obtained against the company which were unsatisfied, and executors had been threatened. The action was based on jeopardy. His lordship directed the usual judgment in a debenture holder's action.

THE POSSIBILITIES of establishing an arsenic industry in Russia are being investigated. The Zolotorud Trust is carrying out the treatment of 500,000 poods of gold-arsenic ore, which is expected to realise 5½ poods of gold, and 40,000 poods of white arsenic.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

McLEOD (HULL), LTD., St. Andrews Works, Mason Street, Hull, manufacturing chemists. (C.C., 5/7/24.) £11 15s. 7d. March 13.

WATERHOUSE AND GRAY, LTD., 51, Stanley Street, Sheffield, manufacturing druggists. (C.C., 5/7/24.) £18 17s. 1d. May 22.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

FLINN AND SON, LTD., Fishersgate, dyers. (M., 5/7/24.) Registered June 12, £10,000 mortgage, to Sir B. S. Johnson, Abbot's Lea, Woolton, and others; charged on properties at Fishersgate, etc. *£8,850. April 2, 1924.

GALJADO PERFUMERY CO., LTD. (late GENERAL EXPORTERS AND IMPORTERS, LTD.), London, E.C. (M., 5/7/24.) Registered June 16, £300 debenture, to S. Sigal, 9, Goswell Road, E.C.; general charge. *£900. January 29, 1924.

GORDON (H.) (LONDON), LTD., London, E.C., druggists' sundriesmen. (M., 5/7/24.) Registered June 18. £5,000 2nd debentures (filed under sec. 93 (3) of the Companies (Consolidation) Act 1908), present issue £2,500; general charge. *——. March 10, 1924.

Satisfaction

BARCLAY, HOBSON AND CO., LTD., Manchester, manufacturing chemists. (M.S., 5/7/24.) Satisfaction registered June 18, £150, registered February 21, 1906.

London Gazette

Partnership Dissolved

CLAREMONT OIL CO. (Stephen HOLLIS and Joseph SMITHARD), oil blenders, 54, Stanley Street, and 15, Barlow Lane, by mutual consent as from March 31, 1924. Debts received or paid by S. Hollis, who continues the business.

New Companies Registered

FRANK LAWRENCE AND SONS, LTD., Perseverance Mills, Wakefield Road, Ossett, Yorks. Makers of acids, bleaching and dyejng materials used in connection with mungo manufacture. Nominal capital, £12,000 in £5 shares.

HENRY MORRIS, LTD., Town Dock, Newport, Mon. Manufacturers of and dealers in lubricants, soap, glycerin, etc. Nominal capital, £10,500 in £1 shares.

SANDEMAN'S VARNISH, LTD., 50, Bilsland Drive, Glasgow. Manufacturers, preparers, distributors, etc., of varnishes, enamels, paints, etc. Nominal capital, £30,000 in £1 shares.

Recent Wills

Mr. Alexander Edwin Tucker, of Four Oaks, analytical chemist	£12,851
Mr. John Wilson, of Melrose Villas, Ballards Lane, Finchley, London, secretary of C. Tennant, Sons and Co., Ltd., Mincing Lane, London	£8,954
Mr. Quixin Wirtz, The Orchard, Philip Lane, Tottenham, London, consulting chemist	£10,832

Tariff Changes

EGYPT.—Duties on alcoholic liquors imported have been revised. In general, all products containing more than 2 per cent. of non-denatured alcohol imported are to be subject to a specific duty at the rate of 200 milliemes per litre of pure alcohol contained in the products, apart from the general duty.

FRANCE.—The duty on sulphates, concentrated to two millionths at the most, and chlorides concentrated to five hundredths at the most, has been reduced to 2 per cent. under both "General" and "Minimum" tariffs.

PORTUGAL.—Chemical exports affected by the new tariff include oils, wood pulp, and sulphate of copper.

TURKEY.—Customs duties levied on imported alcoholic liquors have been revised. The Government has been authorised to institute a monopoly of the manufacture, sale, and importation of spirituous liquors.

NORWAY.—A Bill for the revision of the Norwegian Customs tariff has been drawn up with the intention that it shall replace the present *normal* tariff.

NETHERLANDS.—A proposed Bill seeks to increase the revenue for Customs duties, to simplify the Tariff, and to remove certain inconsistencies. The general duty leviable on most classes of manufactured articles in the Netherlands now stands at 5 per cent., and it is proposed to increase this, for the most part, to 8 per cent.

New Workmen's Compensation Law

JUDGE CLUER made some interesting disclosures with reference to the working of the new Workmen's Compensation Act in the Shoreditch County Court on Thursday, June 25. Dealing with a case in which a sum of £160 for settlement was proposed and £21 costs, Judge Cluer said:—"I now have an important duty to perform in these cases. I am ordered to look into them thoroughly to see that the applicant is not being foolishly led into coming to some unfair settlement, to protect him against an unscrupulous employer, or a too eager solicitor. I have to find out if the insurance company tempts the solicitor to persuade his client to come to a settlement, by paying him excessive costs in the event of a settlement. If £21 costs are to be paid in this case I have to see if it is too much or not, and if they say to me that it is I have to take it away from the solicitor and give it to the applicant, which I will certainly do in this case. I am inclined to think that this settlement for £160 is fair, and I will agree to it in settlement of all claims. Now I shall have to inquire into the costs which have been incurred, and see if the £21, which is being paid to the solicitor, is too much. If it is the applicant will get so much more. Will this money be paid into court?"

Judge Cluer, on hearing that £181 would be paid into court, said: "That will do, and I will find out if the solicitor is entitled to the £21, if he isn't the applicant will get the overcharge."

Fused Quartz Developments

THE recent perfection of the manufacturing methods for the production of clear fused quartz in the United States by the General Electric Co. is thought by our American contemporary, *Industrial and Engineering Chemistry*, to herald considerable developments in commercial utilisation. Up till recently this product could only be obtained in small quantities and worked up into chemical apparatus and similar articles where its peculiar properties rendered it extremely valuable, but now it is understood that the technical difficulties in the way of the production of larger articles of commercial importance have been overcome. In this country, of course, opaque fused quartz has been on the market for some years, thanks to the enterprise of the Thermal Syndicate, Ltd., and has been used in several chemical plants for acid concentration and similar processes, while "Vitreosil" incandescent gas lamp globes have been gaining in popular favour owing to their resistance to sudden changes of temperature. The transparent variety, however, obviously has rather wider uses, especially as the range of transparency is greater than glass, covering as it does both the infra-red and ultra-violet radiations.